CLOSED, DISCMAG, JURY, PATENT

U.S. District Court [LIVE]
Eastern District of TEXAS LIVE (Marshall)
CIVIL DOCKET FOR CASE #: 2:06-cv-00047-TJW-CE

Rembrandt Technologies, LP v. Sharp Corporation et al
Assigned to: Judge T. John Ward
Referred to: Magistrate Judge Charles Everingham
Cause: 35:271 Patent Infringement

Date Filed: 02/03/2006
Jury Demand: Plaintiff
Nature of Suit: 830 Patent
Jurisdiction: Federal Question

Plaintiff

Rembrandt Technologies, LP represented by **Samuel Franklin Baxter**
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Movant

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Counter Claimant

Sharp Electronics Corp.

V.

Counter Defendant

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Counter Claimant

Sharp Corporation

V.

Counter Defendant

Rembrandt Technologies, LP

Date Filed	#	Docket Text
02/03/2006	1	ORIGINAL COMPLAINT WITH JURY TRIAL REQUEST against Sharp Corporation, Sarp Electronics Corp. (Filing fee $ 250.) , filed by Rembrandt Technologies, LP. (Attachments: # 1 Exhibit A# 2 Civil Cover Sheet)(ch,) (Entered: 02/06/2006)
02/03/2006		Summons Issued as to Sharp Corporation, Sarp Electronics Corp.. (ch,) (Entered: 02/06/2006)
02/03/2006	2	Form mailed to Commissioner of Patents and Trademarks. (ch,) (Entered: 02/06/2006)
02/03/2006	3	CORPORATE DISCLOSURE STATEMENT filed by Rembrandt Technologies, LP (ch,) (Entered: 02/06/2006)
02/07/2006		Filing fee: $ 250.00, receipt number 2-1-1135 (ehs,) (Entered: 02/07/2006)
02/22/2006	4	MOTION for Extension of Time to File Answer re 1 Complaint *or Otherwise Respond (Unopposed)* by Sarp Electronics Corp.. (Attachments: # 1 Text of Proposed Order)(Henson, Walter) (Entered: 02/22/2006)
03/02/2006	5	ORDER granting 4 Motion for Extension of Time to Answer. Deadline extended to 3/29/06 for deft Sharp Electronics Corp . Signed by Judge T. John Ward on 3/2/06. (ehs,) (Entered: 03/02/2006)
03/02/2006		Answer Due Deadline Updated for Sharp Corporation to 3/29/2006. (ehs,) (Entered: 03/02/2006)
03/06/2006	6	NOTICE of Attorney Appearance by Robert Christopher Bunt on behalf of Rembrandt Technologies, LP (Bunt, Robert) (Entered: 03/06/2006)
03/09/2006	7	NOTICE of Attorney Appearance by Robert M Parker on behalf of Rembrandt Technologies, LP (Parker, Robert) (Entered: 03/09/2006)
03/17/2006	9	SUMMONS Returned Executed Process Server by Rembrandt Technologies, LP. Sarp Electronics Corp. served on 2/7/2006, answer

		due 2/27/2006. (ch,) (Entered: 03/22/2006)
03/22/2006	8	MOTION for Extension of Time to File Answer re 1 Complaint *or Otherwise Respond (Unopposed)* by Sharp Corporation. (Attachments: # 1 Text of Proposed Order)(Henson, Walter) (Entered: 03/22/2006)
03/29/2006	10	ANSWER to Complaint with Jury Demand *Affirmative Defenses*, COUNTERCLAIM against Rembrandt Technologies, LP by Sarp Electronics Corp..(Henson, Walter) (Entered: 03/29/2006)
03/29/2006	11	CORPORATE DISCLOSURE STATEMENT filed by Sarp Electronics Corp. identifying Sharp Corporation as Corporate Parent. (Henson, Walter) (Entered: 03/29/2006)
03/29/2006	12	NOTICE of Attorney Appearance by Douglas A Cawley on behalf of Rembrandt Technologies, LP (Cawley, Douglas) (Entered: 03/29/2006)
04/06/2006	13	ORDER granting 8 Motion for Extension of Time to Answer re 1 Complaint up to and including 4/28/2006. . Signed by Judge T. John Ward on 4/6/2006. (sm,) (Entered: 04/06/2006)
04/06/2006		Answer Due Deadline Updated for Sharp Corporation to 4/28/2006. (sm,) (Entered: 04/06/2006)
04/11/2006	14	*PLAINTIFF REMBRANDT TECHNOLOGIES'S* ANSWER to Counterclaim *OF SHARP ELECTRONICS CORP* by Rembrandt Technologies, LP.(Sochia, David) (Entered: 04/11/2006)
04/11/2006	15	APPLICATION to Appear Pro Hac Vice by Attorney Richard H Brown for Sharp Electronics Corp.. (ch,) (Entered: 04/13/2006)
04/11/2006		Pro Hac Vice Filing fee paid by Brown; Fee: $25, receipt number: 2-1-1359 (ch,) (Entered: 04/13/2006)
04/11/2006	16	APPLICATION to Appear Pro Hac Vice by Attorney Gerald Levy for Sharp Electronics Corp.. (ch,) (Entered: 04/13/2006)
04/11/2006		Pro Hac Vice Filing fee paid by Levy; Fee: $25, receipt number: 2-1-1359 (ch,) (Entered: 04/13/2006)
04/11/2006	17	APPLICATION to Appear Pro Hac Vice by Attorney Yukio Kashiba for Sharp Electronics Corp.. (ch,) (Entered: 04/13/2006)
04/11/2006		Pro Hac Vice Filing fee paid by Kashiba; Fee: $25, receipt number: 2-1-1359 (ch,) (Entered: 04/13/2006)
04/27/2006	18	ANSWER to Complaint with Jury Demand *Affirmative Defenses*, COUNTERCLAIM against Rembrandt Technologies, LP by Sharp Corporation.(Henson, Walter) (Entered: 04/27/2006)
05/05/2006	19	*Reply and* ANSWER to Counterclaim *of Sharp Corporation* by Rembrandt Technologies, LP.(Sochia, David) (Entered: 05/05/2006)
01/10/2007	20	NOTICE of Hearing: Scheduling Conference set for 2/6/2007 at 1:30 PM in Ctrm 106 (Marshall) before Judge T. John Ward. (shd,) (Entered:

		01/10/2007)
01/12/2007	21	NOTICE of Hearing: Scheduling Conference RESET for 2/20/2007 at 10:30 AM in Ctrm 106 (Marshall) before Judge T. John Ward. (shd,) (Entered: 01/12/2007)
01/12/2007	22	Notice of Scheduling Conference, Proposed Deadlines for Docket Control Order and Discovery Order Scheduling Conference set for 2/6/2007 1:30 PM in (Marshall) before Judge T. John Ward.. Signed by Judge T. John Ward on 1/12/07. (ch,) (Entered: 01/12/2007)
01/29/2007	23	NOTICE by Sharp Corporation, Sharp Electronics Corp. *of Counsel's Change of Firm* (Henson, Walter) (Entered: 01/29/2007)
02/01/2007	24	NOTICE of Attorney Appearance by Charles Ainsworth on behalf of Rembrandt Technologies, LP (Ainsworth, Charles) (Entered: 02/01/2007)
02/01/2007	25	NOTICE of Hearing: Scheduling conference previously set for 2/06/07 has been CANCELLED. Scheduling Conference RESET for 2/20/2007 at 10:30 AM in Ctrm 106 (Marshall) before Judge T. John Ward. (shd,) (Entered: 02/01/2007)
02/16/2007	26	NOTICE by Rembrandt Technologies, LP, Sharp Corporation, Sharp Electronics Corp. re 22 Order, Set Deadlines/Hearings *of Submission of Report of The Parties' Meet and Confer* (Attachments: # 1 Text of Proposed Order Report of the Parties' Meet and Confer)(Henson, Walter) (Entered: 02/16/2007)
02/20/2007	27	TRANSCRIPT of Scheduling Conference held on February 20, 2006 at 10:30 A.M. before Judge T John Ward. Court Reporter: Susan Simmons. 12 pages (ehs,) (Entered: 02/20/2007)
02/20/2007		Scheduling conference held before Judge T. John Ward on 2/20/2007. (Court Reporter Susan Simmons.) (shd,) (Entered: 03/09/2007)
03/05/2007	28	Joint MOTION to Amend/Correct 22 Order, Set Deadlines/Hearings by Rembrandt Technologies, LP. (Attachments: # 1 Text of Proposed Order) (Baxter, Samuel) (Entered: 03/05/2007)
03/07/2007	29	ORDER granting 28 Motion to Amend certain dates in docket control order. Signed by Judge T. John Ward on 3/7/07. (djh,) (Entered: 03/07/2007)
03/08/2007	30	DOCKET CONTROL ORDER - Pltf's Amended Pleadings due by 8/22/2007. Deft's respond to amended pleadings. Discovery due by 4/4/2008. Privilege Logs due 6/11/07. Pltf's Expert Witness List due by 2/15/2008. Deft's expert witness list due 3/14/08. Pltf's trial witnesses due 3/14/08. Deft's trial witnesses due 4/4/08. Joinder of Parties due by 4/27/2007. Markman Hearing set for 11/20/2007 09:00 AM before Judge T. John Ward. Motions in limine due by 5/12/2008. Dispositive motions due 4/11/08. Response to Dispositive motions due 4/25/08. Submit technical tutorials due 11/2/07. Mediation to be completed by 4/18/08. Pretrial Order due by 5/16/2008. Final Pretrial Conference set for 5/22/2008 09:30 AM before Judge T. John Ward. Jury Selection set for

		6/2/2008 09:00AM before Judge T. John Ward. Signed by Judge T. John Ward on 3/8/07. (ehs,) (Entered: 03/08/2007)
03/09/2007	31	NOTICE by Coxcom, Inc., *of Filing Motion for Transfer and Consolidation of Rembrandt Technologies, LP Patent Litigation Pursuant to 28 U.S.C. 1407* (Attachments: # 1 MDL Motion for Transfer and Consolidation# 2 Exhibit Motion Exhibit A# 3 Exhibit Motion Exhibit B# 4 MDL Memorandum# 5 MDL Memo Exhibit List# 6 MDL Notice of Appearance# 7 MDL Corporate Disclosure Statement# 8 MDL Certificate of Service)(Stockwell, Mitchell) (Entered: 03/09/2007)
03/09/2007	32	NOTICE by Coxcom, Inc., re 31 Notice (Other), Notice (Other) *Exhibits to Memorandum in Support of Motion for Transfer and Consolidation* (Attachments: # 1 MDL Ex. 1# 2 MDL Ex. 2# 3 MDL Ex. 3# 4 MDL Ex. 4# 5 MDL Ex. 5# 6 MDL Ex. 6# 7 MDL Ex. 7# 8 MDL Ex. 8# 9 MDL Ex. 9# 10 MDL Ex. 10# 11 MDL Ex. 11# 12 MDL Ex. 12# 13 MDL Ex. 13# 14 MDL Ex. 14# 15 MDL Ex. 15# 16 MDL Ex. 16# 17 MDL Ex. 17# 18 MDL Ex. 18# 19 MDL Ex. 19# 20 MDL Ex. 20# 21 MDL Ex. 21# 22 MDL Ex. 22# 23 MDL Ex. 23# 24 MDL Ex. 24# 25 MDL Ex. 25# 26 MDL Ex. 26# 27 MDL Ex. 27# 28 MDL Ex. 28# 29 MDL Ex. 29# 30 MDL Ex. 30# 31 MDL Ex. 31# 32 MDL Ex. 31# 33 MDL Ex. 33# 34 MDL Ex. 34# 35 MDL Ex. 35# 36 MDL Ex. 36# 37 MDL Ex. 37# 38 MDL Ex. 38# 39 MDL Ex. 39# 40 MDL Ex. 40# 41 MDL Ex. 41# 42 MDL Ex. 42# 43 MDL Ex. 43)(Stockwell, Mitchell) (Entered: 03/09/2007)
03/12/2007	33	NOTICE of Attorney Appearance by Jason Dodd Cassady on behalf of Rembrandt Technologies, LP (Cassady, Jason) (Entered: 03/12/2007)
03/15/2007	34	APPLICATION to Appear Pro Hac Vice by Attorney Jonathan B Tropp for Sharp Corporation and Sharp Electronics Corp. FEE PAID). (ch,) (Entered: 03/15/2007)
04/05/2007	35	NOTICE by Rembrandt Technologies, LP *NOTICE OF FILING OPPOSITION TO COXCOM'S MOTION FOR TRANSFER AND CONSOLIDATION OF REMBRANDT TECHNOLOGIES, LP PATENT* (Attachments: # 1 Reasons Why Oral Argument Should be Heard in Opposition to CoxCom's Motion for Transfer and Consolidation# 2 Response to CoxCom's Motion for Transfer and Consolidation# 3 Rembrandt's Brief in Opposition to CoxCom's Motion to Transfer and Consolidation# 4 Exhibit List# 5 Exhibit 1# 6 Exhibit 2# 7 Exhibit 3# 8 Exhibit 4# 9 Exhibit 5# 10 Exhibit 6# 11 Exhibit 7# 12 Exhibit 8# 13 Exhibit 9# 14 Exhibit 10# 15 Exhibit 11# 16 Exhibit 12# 17 Exhibit 13# 18 Proof of Service)(Baxter, Samuel) (Entered: 04/05/2007)
04/20/2007	36	NOTICE of Disclosure by Sharp Corporation, Sharp Electronics Corp. *(Initial)* (Henson, Walter) (Entered: 04/20/2007)
05/03/2007	37	NOTICE by Sharp Corporation, Sharp Electronics Corp. *of Patent Rules 3.3 and 3.4 Submissions* (Henson, Walter) (Entered: 05/03/2007)
05/04/2007	38	ORDER REFERRING CASE for Pre-trial to Magistrate Judge Charles Everingham pursuant to General Order 07-03. Signed by Judge T. John

		Ward on 5/4/07. (ehs,) (Entered: 05/04/2007)
06/11/2007	39	Joint MOTION for Extension of Time to File *(Exchanging Privilege Logs)* by Rembrandt Technologies, LP, Sharp Corporation, Sharp Electronics Corp.. (Attachments: # 1 Text of Proposed Order)(Henson, Walter) (Entered: 06/11/2007)
06/14/2007	40	ORDER granting 39 Motion for Extension of Time to File Privilege Logs. Deadline extended to 7/16/07. Signed by Judge Charles Everingham on 6/14/07. (ehs,) (Entered: 06/14/2007)
06/25/2007	41	Interdistrict transfer to the District of Delaware, Wilmington, DE. Puruant to letter Elizabeth Dinan has been notified. Certified copy of Docket Sheet, Complaint, Transfer Order and letter were mailed to Federal Blding, Lockbox 18, 844 N. King Street, Wilmington, DE(ch,) Additional attachment(s) added on 6/28/2007 (ch,). Modified on 6/28/2007 (ch,). (Entered: 06/27/2007)

PACER Service Center

Transaction Receipt

07/02/2007 11:33:26

PACER Login:	ud0037	**Client Code:**	
Description:	Docket Report	**Search Criteria:**	2:06-cv-00047-TJW-CE
Billable Pages:	4	**Cost:**	0.32

IN THE UNITED STATES DISTRICT COURT
FOR THE EASTERN DISTRICT OF TEXAS
MARSHALL DIVISION

REMBRANDT TECHNOLOGIES, LP	§	
	§	
Plaintiff,	§	**CIVIL ACTION NO. 2-06CV-47**
vs.	§	
	§	**JURY TRIAL REQUESTED**
SHARP CORPORATION and SHARP ELECTRONICS CORP.	§	
Defendants.	§	

NOTICE OF APPEARANCE

Notice is hereby given that attorney Jason Cassady enters his appearance in this matter as counsel for Plaintiffs for the purpose of receiving notices from the Court. Sam Baxter of McKool Smith, PC will continue to be Lead Attorney.

DATED: March 12, 2007

Respectfully submitted,

McKOOL SMITH, P.C.

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ATTORNEYS FOR PLAINTIFF
REMBRANDT TECHNOLOGIES, LP

CERTIFICATE OF SERVICE

I, hereby certify that a copy of the foregoing Motion was electronically filed in compliance with Local Rule CV-5(a) and served upon all counsel of record on March 12, 2007.

/s/ Jason Cassady

Appendix K **Revised: 1/24/07**

UNITED STATES DISTRICT COURT
EASTERN DISTRICT OF TEXAS
Marshall DIVISION
APPLICATION TO APPEAR PRO HAC VICE

1 This application is being made for the following: Case # 2:06-CV-00047 TJW
Style: Rembrandt Technologies, LP v. Sharp Corporation

2 Applicant is representing the following party/ies: Defendants Sharp Corporation/Sharp Elec. Corp.

3 Applicant was admitted to practice in CT (state) on 12/5/91 (date)

4 Applicant is in good standing and is otherwise eligible to practice law before this court

5. Applicant is not currently suspended or disbarred in any other court.

6. Applicant ~~has~~/has not had an application for admission to practice before another court denied (please circle appropriate language). If so, give complete information on a separate page.

7. Applicant ~~has~~/has not ever had the privilege to practice before another court suspended (please circle). If so, give complete information on a separate page

8 Applicant ~~has~~/has not been disciplined by a court or Bar Association or committee thereof that would reflect unfavorably upon applicant's conduct, competency or fitness as a member of the Bar (please circle) If so, give complete information on a separate page.

9. Describe in detail on a separate page any charges, arrests or convictions for criminal offense(s) filed against you Omit minor traffic offenses. None

10. There are no pending grievances or criminal matters pending against the applicant

11 Applicant has been admitted to practice in the following courts:
Conn.;D.Conn.;S.D.N.Y.;N.D.N.Y.;D.Colo.; 2d Cir.;3d Cir.;Fed. Cir.

12. Applicant has read and will comply with the Local Rules of the Eastern District of Texas, including Rule AT-3, the "Standards of Practice to be Observed by Attorneys"

13 Applicant has included the requisite $25 fee (see Local Rule AT-1(d))

14. Applicant understands that he/she is being admitted for the limited purpose of appearing in the case specified above only

Application Oath:

I, Jonathan B. Tropp do solemnly swear (or affirm) that the above information is true; that I will discharge the duties of attorney and counselor of this court faithfully; that I will demean myself uprightly under the law and the highest ethics of our profession; and that I will support and defend the Constitution of the United States.

Date 3/13/07 Signature Jonathan B. Tropp

UNITED STATES DISTRICT COURT

EASTERN DISTRICT OF TEXAS

APPLICATION TO APPEAR PRO HAC VICE (Continued)

Name (please print) Jonathan B. Tropp
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Firm Name: Day Pitney LLP
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City/State/Zip: Stamford, CT 06901
Telephone #: 203-977-7337
Fax #: 203-977-7301
E-mail Address: jbtropp@daypitney.com
Secondary E-Mail Address:

Applicant is authorized to enter an appearance as counsel for the party/parties listed above. This application has been approved for the court on: 3/17/07

David Maland

David J. Maland, Clerk
U.S. District Court, Eastern District of Texas

By

Deputy Clerk

Receipt for Payment Receipt No: 2-1-90002562

United States District Court

for the

Eastern District of Texas at Marshall

Date: **Thursday, March 15, 2007**

Received from:

DAY PITNEY (RAMEY FLOCK)
100 E FERGUSON STE 500
TYLER, TX 75702

Account	Amount
6855XX	**$25.00**
Total	**$25.00**

Account	Description
085000	Attorney Admission Fees
086400	New Case Fee
086900	Filing Fees
121000	Conscience Fund
129900	Gifts
143500	Interest
322340	Sale of Publications
322350	Copy Fees
322360	Miscellaneous Fees
322380	Recoveries of Court Costs
322386	Cost of Prosecution
504100	Crime Victims Fund
508800	Immigration Fees
510000	Civil Filing Fee (1/2)
5100PL	Partial Filing Fee (PLRA)
510100	Registry Fee
604700	Registry Funds/General and Special Funds
613300	Unclaimed Monies
6855XX	Deposit Funds

Payment method: **Check**

Case or other reference: **2:06cv47 PHV Tropp**

Comments: **CK 23816**

Received by: **pa**

UNITED STATES DISTRICT COURT
FOR THE EASTERN DISTRICT OF TEXAS
MARSHALL DIVISION

REMBRANDT TECHNOLOGIES, LP **Plaintiff,** **v.** **COMCAST CORPORATION, COMCAST CABLE COMMUNICATIONS, LLC, COMCAST OF PLANO, LP** **Defendants.**	)	**Case No. 2:05-CV-443-TJW**
REMBRANDT TECHNOLOGIES, LP **Plaintiff,** **v.** **COMCAST CORPORATION, COMCAST CABLE COMMUNICATIONS, LLC COMCAST OF PLANO, LP** **Defendants.**	)	**Case No. 2:06-CV-506-TJW**
REMBRANDT TECHNOLOGIES, LP **Plaintiff,** **v.** **SHARP CORPORATION and SHARP ELECTRONICS CORP.** **Defendants.**	)	**Case No. 2:06-CV-047-TJW**

REMBRANDT TECHNOLOGIES, LP **Plaintiff,** **v.** **TIME WARNER CABLE, INC.** **Defendant.**	)	**Case No. 2:06-CV-369-TJW**
REMBRANDT TECHNOLOGIES, LP **Plaintiff,** **v.** **TIME WARNER CABLE, INC.** **Defendant.**	)	**Case No. 2:06-CV-224-TJW**
REMBRANDT TECHNOLOGIES, LP **Plaintiff,** **v.** **CHARTER COMMUNICATIONS, INC., CHARTER COMMUNICATIONS OPERATING, LLC, COXCOM INC., CSC HOLDINGS, INC., and CABLEVISION SYSTEMS CORPORATION** **Defendants.**	)	**Case No. 2:06-CV-507-TJW**

REMBRANDT TECHNOLOGIES, LP	)	
	)	
Plaintiff,	)	
	)	
v.	)	**Case No. 2:06-CV-223-TJW**
	)	
CHARTER COMMUNICATIONS, INC., CHARTER COMMUNICATIONS OPERATING LLC, COXCOM, INC., CSC HOLDINGS, INC., and CABLEVISION SYSTEMS CORPORATION	)	
	)	
Defendants.	)	

NOTICE OF FILING OPPOSITION TO COXCOM'S MOTION FOR TRANSFER AND CONSOLIDATION OF REMBRANDT TECHNOLOGIES, LP PATENT LITIGATION

Rembrandt Technologies, LP (Rembrandt) notifies the Court that it has opposed CoxCom's Motion for Transfer and Consolidation Pursuant to 28 U.S.C. §1407. Enclosed with this Notice are copies of the opposition and all documents in support thereof.

DATED: April 5, 2007

Respectfully submitted,

/s/ Sam Baxter

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rmparker@cox-internet.com

ATTORNEYS FOR PLAINTIFF
REMBRANDT TECHNOLOGIES, LP

CERTIFICATE OF SERVICE

The undersigned certifies that the foregoing document was filed electronically in compliance with Local Rule CV-5(a). As such, this document was served on all counsel who have consented to electronic service. Local Rule CV-5(a)(3)(A). Pursuant to Fed. R. Civ. P. 5(d) and Local Rule CV-5(e), all other counsel of record not deemed to have consented to electronic service were served with a true and correct copy of the foregoing by U.S. mail, on this the 5th day of April, 2007.

/s/ Sam Baxter
Sam Baxter

BEFORE THE JUDICIAL PANEL ON MULTIDISTRICT LITIGATION

In re:	)	
Rembrandt Technologies, LP Patent	)	MDL Docket No. 1848
Litigation	)	In re: Rembrandt Technologies, LP
	)	Patent Litigation
	)	
_____	)	ORAL ARGUMENT REQUESTED

REASONS WHY ORAL ARGUMENT SHOULD BE HEARD

Pursuant to Rule 16.1(b), Rembrandt Technologies, LP (Rembrandt) files this statement explaining why oral argument should be heard in opposition to CoxCom's Motion for Transfer and Consolidation.

In its effort to transfer the New York and Texas cases to Delaware for MDL Consolidation, CoxCom has inaccurately described the Rembrandt litigations. Rembrandt respectfully submits that, when accurately understood, given the very different procedural postures of the cases, different patents, and different defendants who are competitors, coordination of the common issues can best be accomplished under the existing structure rather than through MDL consolidation. *In re Eli Lilly and Company (Cephalexin Monohydrate) Patent Litigation,* 446 F. Supp. 242, 244 (J.P.M.L. 1978) (holding that "consultation and cooperation among the three concerned district courts, if deemed appropriate by those courts, coupled with the cooperation of the parties, would be sufficient to minimize the possibility of conflicting pretrial rulings.").

A clearer understanding of the pending litigation, wherein the fourteen actions are already logically grouped and proceeding with coordinated schedules where possible, will assist the Panel in clarifying the confusion present in CoxCom's motion.

Oral argument will also allow the parties to present the Panel current information regarding the status of the actions at issue, most notably Rembrandt's first-filed case: *Rembrandt v. Comcast Corporation, Comcast Cable Communications, LLC, Comcast of Plano, LP,* 2:06-cv-443-TJW (E.D. Tex.) (*Comcast I*). In *Comcast I,* filed in 2005, discovery is drawing to a close, claim construction has been fully briefed, and trial is likely to occur before the end of 2007. Since the outcome of the *Comcast I* litigation may moot part or all of eight other cases involving the patents asserted in *Comcast,* the status of this case is especially important.

Dated: April 4, 2007

Respectfully submitted,

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Attorneys for Rembrandt Technologies, LP

BEFORE THE JUDICIAL PANEL ON MULTIDISTRICT LITIGATION

In re:	)	
	)	
Rembrandt Technologies, LP Patent	)	MDL Docket No. 1848
Litigation	)	In re: Rembrandt Technologies, LP
_____	)	Patent Litigation

RESPONSE TO COXCOM'S MOTION FOR TRANSFER AND CONSOLIDATION

Pursuant to Rule 7.1(b) of the Rules of Procedure of the Judicial Panel on Multidistrict Litigation, Rembrandt Technologies, LP (Rembrandt) responds to the numbered averments set forth in CoxCom's motion. All allegations not expressly admitted are denied.

1. Admitted in part, denied in part. Rembrandt admits that it filed ten of the fourteen actions during the past seven months. Rembrandt admits that it asserted claims against eleven (11) corporations and their related corporate entities for a total of twenty-nine defendants. Admitted that CoxCom seeks transfer and consolidation of fourteen proceedings. At the same time, however, CoxCom argues that claims from nine of these proceedings should be immediately severed from any consolidated action.

2. No response to this paragraph is required.

3. The first sentence of paragraph 3 is admitted, and it is admitted that Rembrandt

acquires patents and has sued entities it believes infringes those patents. The second sentence of paragraph 3 is denied.

4. Denied as stated. Rembrandt initiated thirteen patent cases that are logically grouped as filed and related to different technology, services, and offerings provided by various defendants. It is admitted that the ATSC Digital Television Standard is relevant to some of the cases and that the DOCSIS specification is relevant to some of the cases.

5. Denied in part, admitted in part. Rembrandt initiated the following groups of patent litigation. Group I involves four patents asserted in three actions in the Eastern District of Texas (against Comcast, Charter, CoxCom, and Time Warner). Rembrandt filed suit against Cablevision in the District of Delaware on the same four patents, and Rembrandt also filed suit against Sharp, a television manufacturer, in the Eastern District of Texas on one of the Group I patents (the '627). Group II involves five patents asserted against the same defendants involved in Group I in the Eastern District of Texas (Comcast, Charter, CoxCom, and Time Warner). Rembrandt also filed suit on some of the Group II patents against Adelphia in the Southern District of New York due to particular circumstances of Adelphia's bankruptcy. Group III involves a single patent, the '627, asserted against broadcasters (ABC, CBS, NBC, and Fox), defendants not involved in the Group I or II litigation. CoxCom itself argues that claims involving the '627 patent should be severed from any consolidated proceeding. Separately, CoxCom filed an improper declaratory judgment action against Rembrandt with respect to one of the Group II patents that is the subject of a motion to dismiss. Admitted that separate claims in the '627 patent relate to transmission (the cases against the broadcaster defendants) and reception (the cases against the cable company defendants and Sharp) of digital television signals. The other cases claim infringement by each of the cable company defendants to the extent their services and their use of equipment (not limited to DOCSIS-

complaint modems) infringe each of the particular patents asserted against them.

6. Rembrandt incorporates and realleges its response to paragraph 5.

7. Rembrandt incorporates and realleges its response to paragraph 5.

8. Denied. Judge Ward held scheduling conferences and set pretrial and trial deadlines in five cases. In addition, Judge Ward ruled on a motion to intervene and a motion to disqualify counsel. The *Comcast I* claim construction issues have been fully briefed by the parties and await hearing.

9. Admitted.

10. Denied. Rembrandt incorporates and realleges its responses to paragraph 5. Rembrandt's infringement contentions will not be identical in all fourteen actions that are the subject of CoxCom's motion. Rembrandt cannot comment on the defendants' non-infringement positions and whether they will overlap.

11. Denied. Paragraph 11 states a conclusion of law to which no response is required. To the extent that this paragraph states allegations as to which a response is required, Rembrandt incorporates and realleges is response to paragraph 5 and its brief in opposition to CoxCom's motion to transfer and consolidate.

12. Denied. Rembrandt cannot respond to this averment because the term "overlapping patents" is vague. Except within a particular group of cases, Rembrandt has not asserted patents belonging to the same family or depending from the same patent application. Rembrandt incorporates its brief in opposition to CoxCom's motion to transfer and consolidate.

13. Denied. Rembrandt incorporates its responses to paragraphs 6 and 7. Absent a defendant's deliberate decision to require duplicative discovery of a defendant or third party, Rembrandt does not expect to take duplicative or burdensome discovery.

14. Denied. Rembrandt incorporates its responses to paragraphs 6 and 7. Rembrandt is entitled to damages (not limited to a reasonable royalty) for each patent infringed, and damage awards must be supported by sufficient evidence. *The Georgia-Pacific* factors require analysis of the unique circumstances of each defendant infringer in addition to analysis of Rembrandt and the patents-in-suit. Section 1407 consolidation and transfer is irrelevant to what damages will be received at trial because consolidation and transfer implicate pretrial proceedings.

15. Denied. Of the actions at issue in CoxCom's motion, only six are pending before Judge Sleet in the District of Delaware. Judge Sleet stayed each of these cases before conducting a scheduling conference. Rembrandt incorporates its responses to paragraphs 6 and 7. Moreover, Rembrandt moved to dismiss CoxCom's declaratory judgment action for lack of jurisdiction. Additionally, CoxCom itself argues that all or part of nine of the fourteen actions should be immediately severed from any consolidated proceeding, thus undermining any alleged benefit to centralization.

16. Rembrandt admits the first sentence of paragraph 16. Rembrandt denies that Judge Sleet indicated an interest in coordinating the six actions pending in Delaware. *Sua sponte,* Judge Sleet entered an order staying all of the actions pending before him and did so before holding a scheduling conference in any Rembrandt litigation.

17. Denied. Consolidation and transfer are inappropriate as centralization would not serve the interests of the parties, witnesses, or judiciary nor would it aid in the efficient or just resolution of the cases in question.

WHEREFORE Rembrandt requests that this Panel enter an order denying CoxCom's motion in its entirety, or in the alternative, transfer any actions it deems appropriate to the Eastern District of Texas.

Dated: April 4, 2007

Respectfully submitted,

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BEFORE THE JUDICIAL PANEL ON MULTIDISTRICT LITIGATION

In re:	)	
Rembrandt Technologies, LP Patent	)	MDL Docket No. 1848
Litigation	)	In re: Rembrandt Technologies, LP
	)	Patent Litigation
	)	
	)	ORAL ARGUMENT REQUESTED

REMBRANDT'S BRIEF IN OPPOSITION TO COXCOM'S MOTION TO TRANSFER AND CONSOLIDATE

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FEDERAL CASES

FEDERAL STATUTES

In its effort totransfer the New York and Texas cases to Delaware for MDL Consolidation, CoxCom, Inc. (CoxCom) has inaccurately described the Rembrandt Technologies, LP (Rembrandt) litigations. Rembrandt respectfully submits that, when accurately understood, given the very different procedural postures of the cases, different patents, and different defendants who are competitors, coordination of the common issues can best be accomplished under the existing structure rather than through MDL consolidation. *See In re Eli Lilly and Company (Cephalexin Monohydrate) Patent Litigation,* 446 F. Supp. 242, 244 (J.P.M.L. 1978) (holding that "consultation and cooperation among the three concerned district courts, if deemed appropriate by those courts, coupled with the cooperation of the parties, would be sufficient to minimize the possibility of conflicting pretrial rulings.").

In addition to conceding that consolidation of the majority of the cases would be inefficient[1], CoxCom ignores the fact that the oldest case, filed in the Eastern District of Texas, is too far advanced to benefit from transfer and consolidation. The first of Rembrandt's suits, *Rembrandt v. Comcast Corporation, Comcast Cable Communications, LLC, Comcast of Plano, LP,* 2:06-cv-443-TJW (E.D. Tex.) (*Comcast I*), was filed over eighteen months ago in September 2005. Claim construction has been fully briefed, and the case will likely go to trial before the end of this year. In fact, centralization would not serve the purposes of 28 U.S.C. § 1407 not only because *Comcast I* is nearly trial-ready, but also because eight other cases involving the same patents could be mooted in whole or in part by its resolution. Moreover, delaying the

[1] CoxCom's motion asserts that these cases should be consolidated, then informs the Panel that claims from nine of the fourteen cases should be "severed from the consolidation action" because they involve "completely different technology and activity." CoxCom Memo. at 1, fn 2.

Comcast I trial date by transfer and consolidation to another court would unfairly prejudice Rembrandt and cause inefficiency by forcing another court to re-learn the *Comcast I* issues.

The fourteen actions in dispute are already logically grouped in the appropriate forums with no defendant subject to multiple jurisdictions, save CoxCom which subjected itself to this fate when it chose to file an improper declaratory judgment action in the District of Delaware. CoxCom's presence in dual forums will likely be resolved by the Court's rulings on pending motions to dismiss or transfer. For these reasons and those below, Rembrandt respectfully submits that Section 1407 transfer and consolidation is not necessary or the most appropriate means by which to provide whatever coordination of common issues may be desirable.

If the Panel nevertheless determines that Section 1407 consolidation is desirable, Rembrandt respectfully submits that the cases involving the '627 patent not be consolidated, consistent with CoxCom's motion. Further, if the Panel deems any consolidation appropriate and necessary, then Judge Ward of the Eastern District of Texas is in the best position to decide what coordination would provide efficiencies and, at the same time, not undermine the *Comcast I* progress towards trial.

I. Rembrandt's Actions Are Logically Grouped As Filed.

Rembrandt's case groupings promote efficiency and orderly consideration. CoxCom's recitation of the Rembrandt litigation incorrectly describes the Rembrandt cases. For that reason, Rembrandt corrects the record for the Panel and details the chronological history of Rembrandt's patent litigation.

A. Group I Cable Company Litigation

1. *Comcast I,* filed in September 2005, is at the *Markman* stage.

Rembrandt filed this first case in September 2005, asserting four patents: U.S. Patent Nos. 4,937,819; 5,852,631; 5,719,858; and 5,243,627. Three of these patents (the '819, '631, and '858) relate to improved methods for facilitating communication with modems and are infringed by the provision of high speed internet services. As CoxCom notes, the '627 involves "completely different technology and activity" because it relates to improved error correction in a digital television transmission system and is infringed by the receipt of certain broadcast signals. CoxCom Memo. at 1.

The case is now far advanced. The Court held its initial scheduling conference on May 2, 2006, set the claim construction hearing for February 8, 2007 and the trial for August 8, 2007. Subsequently, a third-party, Time Warner, intervened for the limited purpose of disqualifying Rembrandt's counsel. The Court granted Time Warner's motion a week before the scheduled claim construction hearing and allowed Rembrandt to postpone the hearing while it obtained new counsel. On March 8, 2007, Rembrandt informed the Court that it had retained new counsel and would be ready to proceed with the claim construction hearing on April 23, 2007, or any date thereafter that met the Court's schedule. *See* Exh. 1.

In the meantime, pretrial discovery progressed. Rembrandt and Comcast exchanged infringement and invalidity contentions in accordance with the Patent Rules of the Eastern District of Texas. The Court adopted a protective order under which the parties have produced over four (4) million pages of documents. They have also collectively served 37 interrogatories on each other. In addition, they have subpoenaed or obtained documents from 59

third parties. Some of those parties have produced source code relevant to the issues in the case which is subject to an Escrow Agreement entered by Rembrandt, Comcast, and an escrow agent. The Escrow Agreement governs the review and use of the source code, and much of that source code has been reviewed. Rembrandt has deposed six (6) Comcast witnesses and six (6) third-party witnesses have been deposed. Rembrandt and Comcast have also identified and exchanged claim terms for construction, exchanged proposed constructions for those terms, submitted a Joint Claim Construction Statement to the Court as required by the Eastern District Patent Rules and fully briefed their positions in anticipation of the claim construction hearing.

2. Group I Cases Against Charter, CoxCom and Time Warner.

About nine months after filing *Comcast I*, in June 2006, Rembrandt asserted the same four patents against several other defendants in two separate actions:

- *Rembrandt Technologies, LP v. Charter Communications, Inc. and CoxCom*, 2:06-cv-223 (E.D. Tex) (*Charter/CoxCom I*), filed June 1, 2006.[2]
- *Rembrandt Technologies, LP v. Time Warner Cable, Inc.*, 2:06-CV-224-TJW (E.D. Tex.) (*Time Warner I*), filed June 1, 2006.

Thus, there are now three Group I cases pending before Judge Ward.

The Court held scheduling conferences in each case on April 3, 2007, and proposed trial dates for both cases in August 2008. *See* Exhs. 2-3 (notice of scheduling conferences). Rembrandt and the defendants agreed to, and the Court announced its intention to enter, the same pretrial schedule in both *Charter/CoxCom I* and *Time Warner I*. The parties have further

[2] CoxCom has moved to dismiss the claims against it for lack of personal jurisdiction. Rembrandt has opposed this motion and awaits a ruling from the Court.

agreed to hold only one claim construction hearing in the two cases. Rembrandt is also amenable to re-using discovery across Group I actions where applicable. Indeed, Rembrandt is willing to allow defendants in any of Rembrandt's cases access to prior discovery involving Rembrandt so long as it is relevant to that case. In addition, Rembrandt is willing to seek discovery from third parties only once where that discovery is relevant to, and can be used in, the other actions.

3. *Rembrandt v. Cablevision,* 01:06-cv-365 (D. Del.), filed October 13, 2006.

In October 2006, Rembrandt sued Cablevision in Delaware for infringement of the Group I patents, plus U.S. Patent 5,008,903**.** Rembrandt initially brought this action (but without the '903) in the Eastern District of Texas as part of the *Charter/CoxCom I* suit, but the parties agreed that jurisdiction was not proper there. Rembrandt, therefore, dismissed and re-filed against Cablevision in Delaware. This action has been stayed *sua sponte* by Judge Sleet pending a decision on the instant motion, as have all of the litigations in his Court involving Rembrandt patents. *See* Exh. 4.

B. *Rembrandt v. Sharp,* 2:06-cv-047-TJW (E.D. Tex.), filed February 3, 2006.

On February 3, 2006, Rembrandt asserted only the '627 patent against Sharp, a TV manufacturer. The Sharp case is also pending before Judge Ward in the Eastern District of Texas where a scheduling conference has been held, trial and pretrial deadlines have been set. Rembrandt already has served its infringement contentions in that case. *See* Exh. 5.

C. Group II Cable Company Litigation

1. Cases Pending in the Eastern District of Texas before Judge Ward

Rembrandt next filed a group of cases against a subset of *the same defendants* in the Eastern District of Texas on a completely different set of patents than involved in the Group I litigation. *See* CoxCom Exhs. 7, 11, and 15 (asserting United States Patent Nos. 5,008,903; 5,710,761; 5,778,234; 6,131,159; and 6,950,444). None of the patents in Group II share a specification or patent application with any of the Group I patents.

All of the defendants in the second wave of suits (Time Warner, Charter, CoxCom, and Comcast) were already litigating with Rembrandt before Judge Ward at the time the Group II litigation began. Thus, the parties were familiar with the extensive patent rules imposed by the Court and the District, and Judge Ward is likewise familiar with the parties.

These cases are as follows:

- Rembrandt Technologies, LP v. Time Warner Cable, Inc., 2:06-CV-369-TJW (E.D. Tex.) (*Time Warner II*), filed September 13, 2006
- Rembrandt Technologies, LP v. Comcast Corporation, Comcast Cable Communications, LL, Comcast of Plano, 2:06-CV-506-TJW (E.D. Tex.) (*Comcast II*), filed November 30, 2006
- Rembrandt Technologies, LP v. Charter Communications, Inc., Charter Communications Operating, LLC, CoxCom, Inc., 2:06-CV-507-TJW (E.D. Tex.) (*Charter/CoxCom II*), filed November 30, 2006[3]

[3] CoxCom moved to dismiss the claims against it, just as it responded to the *Cox I* litigation. Alternatively, CoxCom asked the Court to transfer this action to the District of Delaware. Rembrandt similarly opposes this motion to dismiss and awaits a ruling from the Court.

The parties have agreed to place the Group II Litigation on the same pre-trial schedule as *Charter/CoxCom I* and *Time Warner I*, and have agreed to hold one claim construction hearing for the Group II cases. At the scheduling conference on April 2, 2007, the Court indicated its intent to enter the agreed schedule.

2. *Rembrandt Technologies, LP v. Adelphia Communications Corporation,* Adv. Proc. No. 06-01739 (Bankr. S.D.N.Y. 2006), filed September 13, 2006.

In September 2006, Rembrandt filed a patent infringement suit and administrative expense claim against bankrupt Adelphia Cable Corporation and several of its subsidiaries. *See* Exh. 33 to CoxCom's Motion *Rembrandt Technologies, LP v. Adelphia Communications Corporation, Adv. Proc.* No. 06-01739 (Bankr. S.D.N.Y. 2006). In the Adelphia suit, Rembrandt asserted four of the patents that are pending in the Group II cases before Judge Ward (‘444, ‘159, ‘234, and ‘761). Rembrandt would have preferred to have the Eastern District of Texas court adjudicate the suit given its familiarity with the patents, but Rembrandt was compelled to proceed in New York because of the procedural posture of Adelphia's bankruptcy. Specifically Rembrandt needed to object to the plan of reorganization because it did not provide for reserves with which to pay disputed administrated claims after such claims had been allowed. Had Rembrandt not taken this action in New York and succeeded at modifying the plan, proceeding with any infringement claim would have been useless as no funds would have existed to satisfy Rembrandt's judgment.

D. Group III Television Broadcaster Litigation Stayed By Judge Sleet in the District of Delaware.

In December 2006, Rembrandt filed the Group III litigation in Delaware asserting a single patent, the ‘627, against certain television broadcasters - defendants not litigating in the

Eastern District of Texas. These cases are assigned to Judge Sleet who had not yet held a scheduling conference when -- on March 28, 2007 -- the Court entered a *sua sponte* order staying all of the matters involving Rembrandt patents. *See* Exh. 4. CoxCom's statement that Judge Sleet expressed an interest in consolidation of Rembrandt's Delaware cases is unsupported by any record, and Judge Sleet has never voiced such suggestion. In fact, Judge Sleet's only communication with respect to any of the Rembrandt litigation filed in Delaware is a *sua sponte* order staying all Rembrandt litigation in his Court pending this Panel's decision on CoxCom's motion. *See id.*

The Group III cases, all stayed, are as follows:

- *Rembrandt v. CBS*, 1:06-cv-727-GMS (D. Del.), filed December 1, 2006.
- *Rembrandt v. NBC*, 1:06-cv-729-GMS (D. Del.), filed December 1, 2006.
- *Rembrandt v. ABC*, 1:06-cv-730-GMS (D. Del.), filed December 1, 2006.
- *Rembrandt v. Fox*, 1:06-cv-731-GMS (D. Del.), filed December 1, 2006.

E. CoxCom's Decision to File in a Second Forum.

On November 30, 2006, CoxCom filed a declaratory judgment action against Rembrandt in the District of Delaware solely related to the '903 patent**.** *CoxCom, Inc., v. Rembrandt Technologies, LP,* 1:06-cv-721 (D. Del.). Rembrandt moved to dismiss this case on the ground that the Court lacks jurisdiction. *See* Exh. 6. Alternatively, Rembrandt asked the Court to decline to exercise jurisdiction given that the same patent in CoxCom's declaratory judgment action is already being litigated as part of Rembrandt's Group II cases. Judge Sleet has stayed this case as well.

II. Transfer and Consolidation Is Unnecessary and Counterproductive.

A. *Comcast I* is far too advanced to be consolidated.

CoxCom's motion should be denied because "Section 1407 centralization would neither serve the convenience of the parties and witnesses nor further the just and efficient conduct of this litigation." *In re Solaia Technology LLC Patent & Antitrust Litigation,* 346 F. Supp. 2d 1373 (J.P.M.L. 2004) (denying motion to consolidate and transfer where "some constituent actions have already been pending for over two years"). As in *In re Solaia*, the *Comcast I* litigation has been pending for eighteen months and is far too advanced to benefit from assignment to an MDL proceeding. *See also In re Motion Picture Licensing Antitrust Litig.,* 479 F. Supp. 581, 590 (J.P.M.L. 1979) ("We have concluded that some or all claims raised in many of the actions now before us are also inappropriate for transfer, either because discovery and other pretrial proceedings are well advanced in those actions . . ."). Rembrandt filed suit against Comcast in 2005; claim construction is fully briefed and ready for oral argument; and trial is likely to begin several months thereafter. To ask a new Court to learn the patents and issues in dispute at this stage of the proceedings would not be efficient and would cause unjust and undue delay to Rembrandt.

B. *Comcast I* Negates the Need of Consolidation of any Case Involving the Same Patents.

The late stage of the *Comcast I* case impacts not only that one action but the Group I and Group III cases as a whole. The Panel has "consistently denied transfer of actions in patent litigation where one of the actions was proceeding expeditiously toward trial on the common issue of validity." *In re Bourns Patent Litigation,* 385 F. Supp. 1260, 1261 (J.P.M.L. 1974). Because Judge Ward is on the verge of adjudicating the *Comcast I* case, including entering a

claim construction order and trying the validity of the asserted patents, consolidating the other eight cases involving one or more of these patents to another court would be inefficient because a patentee is collaterally estopped from re-litigating the validity of a patent once that issue has been fully adjudicated. *Blonder-Tongue Laboratories, Inc. v. University of Illinois Foundation,* 402 U.S. 313, 28 L. Ed. 2d 788, 91 S. Ct. 1434 (1971).

The Panel has recognized the *Blonder-Tongue* estoppel principle as a reason for denial of Section 1407 transfer. *See In re Eli Lilly and Co.*, 446 F. Supp. at 244 (denying MDL consolidation where "a holding in one action that the two Lilly patents are invalid would likely prove dispositive of that issue in the other two actions"). Applying the precedent of this Panel and *Blonder-Tongue*, given that each of the defendants in the Rembrandt cases has raised invalidity as a defense, any one of the eight later-filed actions could be mooted by a finding in an earlier case that the patents-in-suit are invalid. *Comcast I* will certainly be resolved well before the other cases as it is closer to trial, was filed nine months before the other actions, and the cases before Judge Sleet are stayed.[4]

C. CoxCom Argues that 9 of the 14 Cases Should Not Be Consolidated.

CoxCom has argued that all claims involving the '627 patent should be severed from any consolidated proceeding. That assertion implicates nine of the fourteen cases at issue which CoxCom asserts involve "completely different technology and activity." CoxCom Memo. at 1, footnote 2. The '627 is the only patent asserted in each of the four Group III actions stayed before Judge Sleet in Delaware. Accepting CoxCom's argument that the claims involving the

[4] The other Group I and Group II Cable Company cases are currently scheduled to go to trial beginning in August 2008. Rembrandt believes that the Court will reset *Comcast I* for trial sometime in 2007.

'627 should not be consolidated, no basis exists for centralization under 28 U.S.C. § 1407. As discussed *supra*, the remaining cases are already logically grouped and the first case resolved could moot the other later-filed cases, especially given Judge Sleet's stay of the cases pending before him.

D. The Patents-in-Suit Relate to Different Technology, Weighing Against Consolidation.

The patents asserted by Rembrandt also are not suited for MDL consolidation for at least two other reasons.

First, unlike the situation in *In re Acacia,* where the patents-in-suit all related back to the same parent application and each asserted patent shared the same two inventors, the patents asserted by Rembrandt are neither a family of patents depending all from the same application, nor are the same group of inventors named on each patent. *See In re Acacia Media Technologies Corp. Patent Litigation,* 360 F. Supp. 2d 1377, 1379 (J.P.M.L. 2005) (granting Section 1407 motion where all actions involved the "Yurt family" of patents that related back to the same application); Exhs. 7 - 11.

Second, the argument that all patents that address the provision of cable services and products should be grouped together is contrary to Federal Circuit law regarding claim construction, one of the main pretrial tasks in a patent case. Principles of claim construction mandate close attention to each patent's specification because it "is always highly relevant to the claim construction analysis. Usually it is dispositive; it is the single best guide to the meaning of a disputed term." *Phillips v. AWH Corp.,* 415 F.3d 1303, 1315 (Fed. Cir. 2005) (en banc) (quoting *Vitronics Corp. v. Conceptronic, Inc.,* 90 F.3d 1576, 1582 (Fed. Cir. 1996)). Following the Federal Circuit's guidance, the Court construing the claims of the asserted patents

will need to focus primarily on each patent's specification, so no efficiencies would be gained by considering the patents together merely because they relate to a general industry.

E. Inconsistent Rulings are Not a Concern.

No defendant other than CoxCom is subject to rulings in multiple courts. Since Judge Ward presides over the Group I and Group II Cable Company cases which involve the same defendants, it is unlikely that Judge Ward would rule inconsistently either with respect to a group of patents or with respect to defendants before him in multiple cases. Each defendant will be entitled to its own opportunity to raise unique arguments, and each trial judge will be free to make his own rulings based on the facts and law presented to him.

CoxCom will not be subject to inconsistent rulings because either its declaratory judgment in Delaware or Rembrandt's action in Texas will be transferred or dismissed. In any event, CoxCom will face the '903 patent only once. Put another way, each Defendant faces only one ruling on the meaning of the claims being asserted and only one judgment as to whether its products infringe any particular patent being asserted.

The one party faced with possible inconsistent rulings is Rembrandt because it would be difficult for Rembrandt to take different positions than those previously on record.

F. Alternatives to Transfer and Consolidation Exist and are More Appropriate.

The Panel has denied consolidation where it recognized that "alternatives to transfer exist that can minimize whatever possibilities there might be of duplicative discovery and/or inconsistent pretrial rulings." *In re Soliaia,* 346 F. Supp. 2d at 1373; *In re Eli Lilly and Co. Patent Litigation,* 446 F. Supp. at, 244 ("We observe that suitable alternatives to Section 1407 transfer are available in order to minimize the possibility of duplicative discovery. For example,

notices for a particular deposition could be filed in all actions, thereby making the deposition applicable in each action; the parties could seek to agree upon a stipulation that any discovery relevant to more than one action may be used in all those actions; and any party could seek orders from the three courts directing the parties to coordinate their pretrial efforts."). Indeed, the parties in the Group I and Group II actions pending before Judge Ward are already agreed on identical pretrial schedules for all of the Group I and Group II cases, except *Comcast I*. Rembrandt will make relevant discovery from one action available in other cases where applicable and is amenable to other coordination among the district courts.

Patent damages require defendant-specific discovery regarding at least the following categories of information: profitability associated with the particular invention and the terms and practices pursuant to which that defendant has licensed comparable patents in the past. *See Georgia-Pacific Corp. v. United States Plywood Corp.,* 318 F. Supp. 1116, 1120 (S.D.N.Y. 1970) (holding the following defendant-specific information relevant to damages in a patent case: how a particular defendant infringer has compensated other patent holders (Factor 2), the profitability of the defendant's infringing offerings (Factor 8), and the extent of the defendant infringer's use of the patented invention (Factor 11)). Moreover, many of the defendants compete with one another and presumably will not permit discovery unique to them to be shared among all parties in the Rembrandt litigation.

All of the defendants who are involved in multiple cases are before Judge Ward, save CoxCom, so the Court will be able to supervise discovery and ensure that it is efficient[5]. As

[5] CoxCom inserted itself into two different forums by filing in Delaware long after it was first sued in Texas. The issue of dual forums for CoxCom will be resolved by rulings on the motions to dismiss pending in each forum.

recognized in *In re Eli Lilly*, "consultation and cooperation among the three concerned district courts, if deemed appropriate by those courts, coupled with the cooperation of the parties, would be sufficient to minimize the possibility of conflicting pretrial rulings. " 446 F. Supp. at 244.

CoxCom miscited Rembrandt's suggestion for the type of district court coordination recognized in *Eli Lilly* as an indication that Rembrandt supports Section 1407 transfer. CoxCom Memo. at 3 ("[E]ven Rembrandt believes that transfer and consolidation under 28 U.S.C. § 1407 is desirable." (citing CoxCom Exh. 43 at Exh. C at 13:16-14:10)). CoxCom is wrong. Rembrandt has never argued that consolidation of all of its cases would be appropriate, otherwise it would have filed all of its actions in the same forum in the first instance or moved itself for Section 1407 transfer.

In the hearing transcript cited by CoxCom, Rembrandt's counsel advised the Bankruptcy Court in the Southern District of New York of ongoing litigation in the Eastern District of Texas and, in response to a question from the Court, said that the Bankruptcy Court might benefit from sharing pretrial proceedings with that Court. *See id.* ("[I]f . . .Your Honor wanted to coordinate with Judge Ward and reach some sort of mutual claim construction with Judge Ward . . . it might be a good idea for you to coordinate with the Eastern District of Texas with respect to issues like that. . . .if Your Honor wanted to coordinate more closely with the Eastern District and sort of follow along on pretrial matters with that district in the Time Warner case, I think that probably would be advantageous to everyone involved."). Rembrandt never advocated MDL consolidation of all of its actions, as the only ones discussed at that hearing were the Group II cases and the Adelphia proceeding. Instead, Rembrandt agreed with this Panel's prior rulings that coordination among district courts is a good alternative to Section 1407 transfer and consolidation.

III. The Eastern District of Texas Is the Most Logical Transferee Court.

For the above reasons, Rembrandt opposes consolidation and transfer. However, should the Panel rule that consolidation and transfer is appropriate, the factors cited by CoxCom to determine the best forum for centralization all point to Judge Ward of the Eastern District of Texas. Taking CoxCom's enumerated factors in order:

A. The Pendency in that District of a Number of the Actions.

Judge Ward currently has responsibility for seven of the fourteen actions that are the subject of CoxCom's motion, including the Rembrandt litigation that has been on file since September 2005. Judge Sleet, by contrast, presides over six cases at issue, four of the six dealing only with U.S. Patent No. 5,243,627 ('627), claims that CoxCom argues should be severed immediately following consolidation. A fifth case involves claims of the '627 patent and other Rembrandt patents. The sixth case pending before Judge Sleet, CoxCom's declaratory judgment action on the '903, would be dismissed if Rembrandt's pending motion is granted. Thus, when examined closely, Judge Sleet has only one case before him that CoxCom itself argues should be consolidated in its entirety, and that case is subject to a motion to dismiss and is stayed.

B. The Court's Familiarity with the Issues.

In *Comcast I,* claim construction has been fully briefed and trial may occur this year. Judge Ward has all of the patents-in-suit before him and is the only judge in this position. Judge Ward has presided over Rembrandt's litigation for over eighteen months and is most familiar with the patents at issue. As this Panel has recognized, the longstanding pendency of one of the actions weighs in the determination of a transferee judge. *See In re JP Morgan Chase & Co. Securities Litigation,* 452 F. Supp.2d 1350 (J.P.M.L. 2006) ("The Panel is persuaded that the

Northern District of Illinois is an appropriate transferee district for this litigation. The action pending there, which is the earliest filed of the three actions, is more procedurally advanced than the two Delaware actions.").

Judge Ward's background gained by adjudicating *Comcast I* will aid in the resolution of the rest of the Group I litigation. In addition to his familiarity with the patents at issue in the Group I cases, the same parties are before Judge Ward in both the Group I and Group II cases, so the parties are familiar with the local rules as well as Judge Ward's individual practices. Judge Ward is also familiar with any unique issues presented by those parties, including their scheduling needs. Moreover, transfer of the remaining cases to Judge Ward would not greatly increase the Court's workload given that all nine patents at issue are already before it in pending proceedings.

In contrast, Judge Sleet has not taken any action on the Rembrandt cases, except to stay all of them pending a decision by this Panel. Transfer and consolidation before Judge Sleet at this juncture would unfairly delay trial of *Comcast I,* a case that has been on file for eighteen months and is likely to be tried this year. In order to handle the MDL, Judge Sleet would, at a minimum, need to spend time familiarizing himself with the four patents-in-suit to which he has had no introduction and decide pretrial matters based on prior events in the litigation before his involvement. These tasks would delay Rembrandt's day in court indefinitely when Judge Ward is ready to proceed to trial several months from now.

C. The District or Judge's Willingness to Accept Responsibility for Conducting Coordinated or Consolidated Pretrial Proceedings.

CoxCom tells the Panel that "Judge Sleet has already indicated an interest in at least coordinating the six Rembrandt actions pending in Delaware." CoxCom Memo. at 17 citing

CoxCom Exh. 19 at 3-4. But CoxCom's sole basis for this statement (CoxCom Exh. 19) is a status report **filed by the parties with no statements from the Court.** In that statement, the parties notify the Court of other Rembrandt litigation, but there is no indication whatsoever that Judge Sleet has expressed an interest in consolidating the cases pending in Delaware. Judge Sleet *sua sponte* stayed all litigation involving Rembrandt patents in his Court before convening any scheduling conferences.

Rembrandt cannot speak to Judge Ward's willingness to preside over MDL proceedings for these cases, but the Court's familiarity with patent cases is well-recognized. Judge Ward has presided over more than one hundred patent cases.

D. The Eastern District of Texas Docket Is More Favorable.

CoxCom contorts its own articulated factor "favorable status of the civil docket" by suggesting that Delaware should be deemed favorable because fewer cases were pending there in 2006 than were pending in 2005. CoxCom Memo. at 18. The Federal Judiciary statistics computing the median time from filing to trial reflect that this interval stands at 17.7 months in the Eastern District of Texas as compared to Delaware where that same process takes 26 months. *See* Exhs. 12-13 (citing Administrative Office of the Federal Courts Federal Court Management Statistics for the 12-month period ending September 30, 2006, available at http://www.uscourts.gov/fcmstat/ index.html).

E. Place of Incorporation Is Irrelevant to the Location for an MDL Proceeding.

Given that the factors cited by CoxCom exclusively favor transfer to the Eastern District of Texas, CoxCom's argument in favor of Delaware rests on the false premise that centralization should follow the place of incorporation of some of the parties. CoxCom Memo. at 19.

CoxCom argues - without any precedent - that the place of incorporation of the defendants weighs in favor of transfer to Delaware. Left without legal support, CoxCom submits that Delaware would be "convenient for parties, witnesses and discovery." CoxCom Memo. at 19. But this bald assertion is not supported by any facts. CoxCom has not shown that any of the defendants' witnesses are resident in Delaware much less a substantial majority of them, nor that the companies themselves have a large center of operations in Delaware. CoxCom has far from met the movant's burden to establish that Delaware is any more convenient than the Eastern District of Texas.

If CoxCom's motion compels consolidation and transfer, Judge Ward's Court is the obvious choice for transferee court because of the judges presiding over Rembrandt patent litigation:

- Only Judge Ward already has all nine patents-in-suit before him.
- Only Judge Ward has half of the pending actions before him already.
- Judge Ward's cases are the most advanced by far of any of the litigation.
- The Eastern District of Texas has a faster time to trial than Delaware.
- The Eastern District of Texas Patent Rules are familiar to the parties and enable fast resolution of these cases.

IV. Conclusion

Because centralization would neither aid in the just and efficient resolution of the Rembrandt's patent litigation nor serve the convenience of the parties and witnesses, CoxCom's motion should be denied. In the event that centralization is deemed appropriate, the Eastern District of Texas is the most logical forum for the transferee court given Judge Ward's familiarity with the issues and investment in the litigation thus far.

Dated: April 4, 2007

Respectfully submitted,

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BEFORE THE JUDICIAL PANEL ON MULTIDISTRICT LITIGATION

In re:	)	
Rembrandt Technologies, LP Patent	)	MDL Docket No. 1848
Litigation	)	In re: Rembrandt Technologies, LP
	)	Patent Litigation
	)	
	)	ORAL ARGUMENT REQUESTED

MDL EXHIBIT LIST IN SUPPORT OF REMBRANDT'S BRIEF IN OPPOSITION TO COXCOM'S MOTION TO TRANSFER AND CONSOLIDATE

In compliance with Rule 7.1 (g) of the Rules of Procedure of the Judicial Panel on Multidistrict Litigation, Rembrandt Technologies, LP (Rembrandt) herewith submits copies of the following referenced exhibits in support of its Brief in Opposition to CoxCom's Motion for Transfer and Consolidation of Rembrandt Technologies Patent Litigation:

Exhibit 1	Status Report on Claim Construction Hearing and Case Schedule, filed on March 8, 2007, in the matter of *Rembrandt Technologies, LP v. Comcast Corporation, et. al.* No. 2:05-cv-00443-TJW (E.D. Tex.)
Exhibit 2	Notice of Scheduling Conference, Proposed Deadlines for Docket Control Order and Discovery Order, filed on March 14, 2007, in the matter of *Rembrandt Technologies, LP v. Charter Communications, Inc., et. al.* No. 2:06-cv-223-TJW (E.D. Tex.)
Exhibit 3	Notice of Scheduling Conference, Proposed Deadlines for Docket Control Order and Discovery Order, filed on March 14, 2007, in the matter of *Rembrandt Technologies, LP v. Time Warner Cable, Inc.* No. 2:06-cv-224-TJW (E.D. Tex.)
Exhibit 4	Order Staying Civil Actions, filed March 26, 2007, in the following matters: *Rembrandt Technologies, LP v. Cablevision Systems Corporation,* No. 06-635-GMS (D. Del.); *CoxCom, Inc. v. Rembrandt Technologies, LP,* No. 06-721-GMS (D. Del); *Rembrandt Technologies, LP v. CBS Corporation,* No. 06-727-GMS (D. Del); *Rembrandt Technologies, LP v. NBC Universal Inc.,* No. 06-729-GMS (D. Del.); *Rembrandt Technologies, LP v. ABC, Inc.,* No. 06-730-GMS (D. Del.); *Rembrandt Technologies, LP v. Fox Entertainment Group, Inc.,* No. 06-731-GMS (D. Del.)
Exhibit 5	Docket Control Order, filed on March 8, 2007, in the matter of *Rembrandt Technologies, LP v. Sharp Corporation and Sharp Electronics Corp.,* No. 2:06-cv-047-TJW (E.D. Tex.)
Exhibit 6	Rembrandt Technologies, LP's Opening Brief in Support of It's Motion to Dismiss Pursuant to Federal Rule 12(b)(1), filed on January 26, 2007, in the matter of *CoxCom, Inc. v. Rembrandt Technologies, LP.,* No. 06-721-GMS (D. Del.)
Exhibit 7	U.S. Patent No. 5,550,863
Exhibit 8	U.S. Patent No. 5,253,275
Exhibit 9	U.S. Patent No. 5,132,992
Exhibit 10	U.S. Patent No. 6,144,702
Exhibit 11	U.S. Patent No. 6,002,720

Exhibit 12	Federal Court Management Statistics - Judicial Caseload Profile for the 12-month period ending September 30, 2006 (E.D. Tex.)
Exhibit 13	Federal Court Management Statistics - Judicial Caseload Profile for the 12-month period ending September 30, 2006 (D. Del.)

Dated: April 4, 2007

Respectfully submitted,

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EXHIBIT

1

IN THE UNITED STATES DISTRICT COURT
FOR THE EASTERN DISTRICT OF TEXAS
MARSHALL DIVISION

REMBRANDT TECHNOLOGIES, LP	§	
	§	
Plaintiff,	§	
	§	
vs.	§	**Case No. 2:05-CV-00443-TJW**
	§	
COMCAST CORPORATION;	§	**JURY TRIAL REQUESTED**
COMCAST CABLE	§	
COMMUNICATIONS, LLC; AND	§	
COMCAST OF PLANO, LP,	§	
	§	
Defendants.	§	

STATUS REPORT
ON
CLAIM CONSTRUCTION HEARING AND CASE SCHEDULE

Plaintiff Rembrandt Technologies, LP ("Rembrandt"), pursuant to this Court's Orders of February 1, 2007 (Docket No. 140) and February 8, 2007 (Docket No. 145) submits this Status Report on (i) the Claim Construction Hearing and (ii) the Case Schedule.

1. **Claim Construction Hearing.** Rembrandt will be prepared to proceed with the Claim Construction Hearing in this case the week of April 23, 2007, or any time thereafter. Rembrandt requests that the Court set the Claim Construction Hearing as the Court's schedule permits during or after the week of April 23, 2007.

2. **Case Schedule.** If acceptable to the Court, Rembrandt proposes that within 15 business days after the date the Court informs the Parties of the new date for the Claim Construction Hearing, Rembrandt will inform the Court whether it believes that a new schedule is necessary and, if necessary, will submit a proposed schedule with new deadlines. Rembrandt will attempt to reach agreement with the Comcast Parties on any proposed deadlines.

Dated: March 8, 2007

Respectfully, submitted,

/s/ Sam Baxter

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CERTIFICATE OF CONFERENCE

Counsel for Rembrandt discussed the status report with counsel for the Comcast Parties. The Comcast Parties were not able to join in the status report.

/s/ Jeffrey A. Carter
Jeffrey A. Carter

CERTIFICATE OF SERVICE

The undersigned certifies that the foregoing document was filed electronically in compliance with Local Rule CV-5(a), contemporaneously served upon all counsel who have consented to electronic service and served by first class mail on other counsel on this the 8th day of March, 2007.

/s/ Sam Baxter
Sam Baxter

EXHIBIT

2

IN THE UNITED STATES DISTRICT COURT
FOR THE EASTERN DISTRICT OF TEXAS
MARSHALL DIVISION

REMBRANDT TECHNOLOGIES, LP	§	
	§	
V.	§	CIVIL NO. 2:06-CV-223(TJW)
	§	
CHARTER COMMUNICATIONS, INC.,	§	
ET AL.	§	

**NOTICE OF SCHEDULING CONFERENCE,
PROPOSED DEADLINES FOR DOCKET CONTROL ORDER
AND DISCOVERY ORDER**

The court, *sua sponte*, issues this Notice of Scheduling Conference, Proposed Deadlines for Docket Control Order and Discovery Order.

Notice of Scheduling Conference

Pursuant to Fed. R. Civ. P. 16 and Local Rule CV-16, the Scheduling Conference in this case is set for **April 3, 2007, at 2:00 p.m. in Marshall, Texas.** The parties are directed to meet and confer in accordance with Fed. R. Civ. P. 26(f) prior to the conference. The parties are excused from the requirement of filing a written proposed discovery plan in this case.

Proposed Deadlines for Docket Control Order

The proposed deadlines for docket control order set forth in the attached Appendix A shall be discussed at the Scheduling Conference. The court will not modify the proposed trial date except for good cause shown.

Discovery Order

After a review of the pleaded claims and defenses in this action and in furtherance of the management of the court's docket under Fed. R. Civ. P. 16, it is ORDERED AS FOLLOWS:

1. **Disclosures.** Except as provided by paragraph 1(h), and, to the extent not already disclosed,

within thirty (30) days after the Scheduling Conference, each party shall disclose to every other party the following information:

(a) the correct names of the parties to the lawsuit;

(b) the name, address, and telephone number of any potential parties;

(c) the legal theories and, in general, the factual bases of the disclosing party's claims or defenses (the disclosing party need not marshal all evidence that may be offered at trial);

(d) the name, address, and telephone number of persons having knowledge of relevant facts, a brief statement of each identified person's connection with the case, and a brief, fair summary of the substance of the information known by any such person;

(e) any indemnity and insuring agreements under which any person or entity carrying on an insurance business may be liable to satisfy part or all of a judgment entered in this action or to indemnify or reimburse for payments made to satisfy the judgment;

(f) any settlement agreements relevant to the subject matter of this action;

(g) any statement of any party to the litigation;

(h) for any testifying expert, by the date set by the court in the Docket Control Order, each party shall disclose to the other party or parties:

a. the expert's name, address, and telephone number;

b. the subject matter on which the expert will testify;

c. if the witness is retained or specially employed to provide expert testimony in the case or whose duties as an employee of the disclosing party regularly involve giving expert testimony:

(a) all documents, tangible things, reports, models, or data compilations

that have been provided to, reviewed by, or prepared by or for the expert in anticipation of the expert's testimony; and

(b) the disclosures required by Fed. R. Civ. P. 26(a)(2)(B) and Local Rule CV-26.

d. for all other experts, the general substance of the expert's mental impressions and opinions and a brief summary of the basis for them or documents reflecting such information;

Any party may move to modify these disclosures for good cause shown.

2. **Protective Orders.** Upon the request of any party before or after the Scheduling Conference, the court shall issue the Protective Order in the form attached as Appendix B. Any party may oppose the issuance of or move to modify the terms of the Protective Order for good cause.

3. **Additional Disclosures.** In addition to the disclosures required in Paragraph 1 of this Order, at the Scheduling Conference, the court shall amend this discovery order and require each party, without awaiting a discovery request, to provide, to the extent not already provided, to every other party the following:

(a) the disclosures required by the Patent Rules for the Eastern District of Texas;

(b) within forty-five (45) days after the Scheduling Conference, a copy of all documents, data compilations, and tangible things in the possession, custody, or control of the party that are relevant to the case, except to the extent these disclosures are affected by the time limits set forth in the Patent Rules for the Eastern District of Texas. By written agreement of all parties, alternative forms of disclosure may be provided in lieu of paper copies. For example, the parties may agree to exchange images of

documents electronically or by means of computer disk; or the parties may agree to review and copy disclosure materials at the offices of the attorneys representing the parties instead of requiring each side to furnish paper copies of the disclosure materials;

(c) within forty-five (45) days after the Scheduling Conference, a complete computation of any category of damages claimed by any party to the action, making available for inspection and copying as under Rule 34, the documents or other evidentiary material on which such computation is based, including materials bearing on the nature and extent of injuries suffered; and

(d) within forty-five (45) days after the Scheduling Conference, those documents and authorizations described in Local Rule CV-34; and

The court shall order these disclosures in the absence of a showing of good cause by any party objecting to such disclosures.

4. **Discovery Limitations**. At the Scheduling Conference, the court shall also amend this discovery order to limit discovery in this cause to the disclosures described in Paragraphs 1 and 3 together with 60 interrogatories, 60 requests for admissions, the depositions of the parties, depositions on written questions of custodians of business records for third parties, depositions of three (3) expert witnesses per side and forty (40) hours of additional depositions per side. "Side" means a party or a group of parties with a common interest. Any party may move to modify these limitations for good cause.

5. **Privileged Information**. There is no duty to disclose privileged documents or information. However, the parties are directed to meet and confer concerning privileged documents or information after the Scheduling Conference. Within sixty (60) days after the Scheduling

Conference, the parties shall exchange privilege logs identifying the documents or information and the basis for any disputed claim of privilege in a manner that, without revealing information itself privileged or protected, with enable the other parties to assess the applicability of the privilege or protection. Any party may move the court for an order compelling the production of any documents or information identified on any other party's privilege log. If such a motion is made, the party asserting privilege shall respond to the motion within the time period provided by Local Rule CV-7. The party asserting privilege shall then file with the Court within thirty (30) days of the filing of the motion to compel any proof in the form of declarations or affidavits to support their assertions of privilege, along with the documents over which privilege is asserted for *in camera* inspection. If the parties have no disputes concerning privileged documents or information, then the parties shall inform the court of that fact within sixty (60) days after the Scheduling Conference.

6. **Pre-trial disclosures**. Absent a showing of good cause by any party, the court shall require the following additional disclosures:

Each party shall provide to every other party regarding the evidence that the disclosing party may present at trial as follows:

(a) The name and, if not previously provided, the address and telephone number, of each witness, separately identifying those whom the party expects to present at trial and those whom the party may call if the need arises.

(b) The designation of those witnesses whose testimony is expected to be presented by means of a deposition and, if not taken stenographically, a transcript of the pertinent portions of the deposition testimony.

(c) An appropriate identification of each document or other exhibit, including summaries

of other evidence, separately identifying those which the party expects to offer and those which the party may offer if the need arises.

Unless otherwise directed by the court, these disclosures shall be made at least 30 days before trial. Within 14 days thereafter, unless a different time is specified by the court, a party may serve and file a list disclosing (1) any objections to the use under Rule 32(a) of a deposition designated by another party under subparagraph (B), and (2) any objections, together with the grounds therefor, that may be made to the admissibility of materials identified under subparagraph (c). Objections not so disclosed, other than objections under Rules 402 and 403 of the Federal Rules of Evidence, shall be deemed waived unless excused by the court for good cause shown.

7. **Signature.** The disclosures required by this order shall be made in writing and signed by the party or counsel and shall constitute a certification that, to the best of the signer's knowledge, information and belief, such disclosure is complete and correct as of the time it is made. If feasible, counsel shall meet to exchange disclosures required by this order; otherwise, such disclosures shall be served as provided by Fed. R. Civ. P. 5. The parties shall promptly file a notice with the court that the disclosures required under this order have taken place.

8. **Duty to Supplement**. After disclosure is made pursuant to this order, each party is under a duty to supplement or correct its disclosures immediately if the party obtains information on the basis of which it knows that the information disclosed was either incomplete or incorrect when made, or is no longer complete or true.

9. **Disputes.**

(a) Except in cases involving claims of privilege, any party entitled to receive disclosures may, after the deadline for making disclosures, serve upon a party required to make

disclosures a written statement, in letter form or otherwise, of any reason why the party entitled to receive disclosures believes that the disclosures are insufficient. The written statement shall list, by category, the items the party entitled to receive disclosures contends should be produced. The parties shall promptly meet and confer. If the parties are unable to resolve their dispute, then the party required to make disclosures shall, within fourteen (14) days after service of the written statement upon it, serve upon the party entitled to receive disclosures a written statement, in letter form or otherwise, which identifies (1) the requested items that will be disclosed, if any, and (2) the reasons why any requested items will not be disclosed. The party entitled to receive disclosures may thereafter file a motion to compel.

(b) Counsel are directed to contact the chambers of the undersigned for any "hot-line" disputes before contacting the Discovery Hotline provided by Local Rule CV-26(e). If the undersigned is not available, the parties shall proceed in accordance with Local Rule CV-26(e).

10. **No Excuses.** A party is not excused from the requirements of this Discovery Order because it has not fully completed its investigation of the case, or because it challenges the sufficiency of another party's disclosures, or because another party has not made its disclosures. Absent court order to the contrary, a party is not excused from disclosure because there are pending motions to dismiss, to remand or to change venue.

11. **Filings.** Any filings in excess of twenty (20) pages, counsel is directed to provide a courtesy copy to Chambers, simultaneously with the date of filing.

12. **Modifications to Patent Rules.** The attached Appendix C applies to this case and supplements the Patent Rules for the Eastern District of Texas. These modifications are not intended to apply to any other case except as may be expressly provided by order of this Court.

SIGNED this 14th day of March, 2007.

T. John Ward

T. JOHN WARD
UNITED STATES DISTRICT JUDGE

APPENDIX A

PROPOSED DEADLINES FOR DOCKET CONTROL ORDER

PROPOSED DEADLINES TO BE DISCUSSED AT THE SCHEDULING CONFERENCE APRIL 3, 2007

Monday, August 4, 2008	Jury Selection - 9:00 a.m. in **Marshall, Texas**
July 24, 2008	Pretrial Conference - 9:30 a.m. in **Marshall, Texas**
July 21, 2008	Joint Pretrial Order, Joint Proposed Jury Instructions and Form of the Verdict.
July 21, 2008	**Motions in Limine (due three days before final Pre-Trial Conference).** Three (3) days prior to the pre-trial conference provided for herein, the parties shall furnish a copy of their respective Motions in Limine to the Court by facsimile transmission, **903/935-2295**. The parties are directed to confer and advise the Court on or before 3:00 o'clock p.m. the day before the pre-trial conference which paragraphs are agreed to and those that need to be addressed at the pre-trial conference. **The parties shall limit their motions in limine to those issues which, if improperly introduced into the trial of the cause, would be so prejudicial that the Court could not alleviate the prejudice with appropriate instruction(s).**
July 7, 2008	Response to Dispositive Motions (including *Daubert* motions)
July 7, 2008	**Notice of Request for Daily Transcript or Real Time Reporting of Court Proceedings.** If a daily transcript or real time reporting of court proceedings is requested for trial, the party or parties making said request shall file a notice with the Court and e-mail the Court Reporter, Susan Simmons, at lssimmons@yahoo.com.

June 20, 2008	For Filing Dispositive Motions and any other motions that may require a hearing (including *Daubert* motions) **Responses to dispositive motions filed prior to the dispositive motion deadline, including *Daubert* Motions, shall be due in accordance with Local Rule CV-7(e). Motions for Summary Judgment shall comply with Local Rule CV56.**
May 21, 2008	Defendant to Identify Trial Witnesses
May 7, 2008	Plaintiff to Identify Trial Witnesses
May 7, 2008	Discovery Deadline
_____	**30** Days after claim construction ruling Designate Rebuttal Expert Witnesses other than claims construction Expert witness report due Refer to Discovery Order for required information.
_____	**15** Days after claim construction ruling Comply with P.R. 3-8.
_____	**15** Days after claim construction ruling Party with the burden of proof to designate Expert Witnesses other than claims construction Expert witness report due Refer to Discovery Order for required information.
February 6, 2008	Claim construction hearing 9:00 a.m., **Marshall, Texas**.
January 14, 2008	Comply with P.R. 4-5(c).
January 7, 2008	Comply with P.R. 4-5(b).

December 24, 2007	Comply with P.R. 4-5(a).
November 30, 2007	Discovery deadline–claims construction issues
November 23, 2007	Respond to Amended Pleadings
November 9, 2007	Amend Pleadings **(It is not necessary to file a Motion for Leave to Amend before the deadline to amend pleadings except to the extent the amendment seeks to add a new patent in suit. It is necessary to file a Motion for Leave to Amend after November 9, 2007).**
November 9, 2007	Comply with P.R. 4-3.
October 9, 2007	Comply with P.R. 4-2.
September 19, 2007	Comply with P.R. 4-1.
May 18, 2007	Comply with P.R. 3-3.
June 4, 2007	Privilege Logs to be exchanged by parties (or a letter to the Court stating that there are no disputes as to claims of privileged documents).
May 3, 2007	Join Additional Parties
April 13, 2007	Comply with P.R. 3-1

To be discussed at Scheduling Conference	Mediation to be completed If the parties agree that mediation is an option, the Court will appoint a mediator or the parties will mutually agree upon a mediator. If the parties choose the mediator, they are to inform the Court by letter the name and address of the mediator. The courtroom deputy will immediately mail out a "mediation packet" to the mediator for the case. The mediator shall be deemed to have agreed to the terms of Court Ordered Mediation Plan of the United States District Court of the Eastern District of Texas by going forth with the mediation. General Order 99-2.
April 3, 2007	Scheduling Conference (All attorneys are directed to Local Rule CV-16 for scope of the Scheduling Conference).

The parties are directed to Local Rule CV-7(d), which provides in part that "[i]n the event a party fails to oppose a motion in the manner prescribed herein the court will assume that the party has no opposition." Local Rule CV-7(e) provides that a party opposing a motion has **12 days, in addition to any added time permitted under Fed. R. Civ. P. 6(e),** in which to serve and file a response and any supporting documents, after which the court will consider the submitted motion for decision.

OTHER LIMITATIONS

1. All depositions to be read into evidence as part of the parties' case-in-chief shall be **EDITED** so as to exclude all unnecessary, repetitious, and irrelevant testimony; **ONLY** those portions which are relevant to the issues in controversy shall be read into evidence.

2. The Court will refuse to entertain any motion to compel discovery filed after the date of this Order unless the movant advises the Court within the body of the motion that counsel for the parties have first conferred in a good faith attempt to resolve the matter. See Eastern District of Texas Local Rule CV-7(h).

3. The following excuses will not warrant a continuance nor justify a failure to comply with the discovery deadline:

   (a) The fact that there are motions for summary judgment or motions to dismiss pending;

(b) The fact that one or more of the attorneys is set for trial in another court on the same day, unless the other setting was made prior to the date of this order or was made as a special provision for the parties in the other case;

(c) The failure to complete discovery prior to trial, unless the parties can demonstrate that it was impossible to complete discovery despite their good faith effort to do so.

APPENDIX B

IN THE UNITED STATES DISTRICT COURT
FOR THE EASTERN DISTRICT OF TEXAS
MARSHALL DIVISION

REMBRANDT TECHNOLOGIES, LP	§	
	§	
V.	§	CIVIL NO. 2:06-CV-223(TJW)
	§	
CHARTER COMMUNICATIONS, INC.,	§	
ET AL.	§	

STANDARD PROTECTIVE ORDER

The Court, *sua sponte*, issues this Protective Order to facilitate document disclosure and production under the Local Rules of this Court and the Federal Rules of Civil Procedure. Unless modified pursuant to the terms contained in this Order, this Order shall remain in effect through the conclusion of this litigation.

In support of this order, the court finds that:

1. Documents or information containing confidential proprietary and business information and/or trade secrets ("Confidential Information") that bear significantly on the parties' claims or defenses is likely to be disclosed or produced during the course of discovery in this litigation;

2. The parties to this litigation may assert that public dissemination and disclosure of Confidential Information could severely injure or damage the party disclosing or producing the Confidential Information and could place that party at a competitive disadvantage;

3. Counsel for the party or parties receiving Confidential Information are presently without sufficient information to accept the representation(s) made by the party or parties producing Confidential Information as to the confidential, proprietary, and/or trade secret nature of such

Confidential Information; and

4. To protect the respective interests of the parties and to facilitate the progress of disclosure and discovery in this case, the following Order should issue:

IT IS THEREFORE ORDERED THAT:

1. Documents or discovery responses containing Confidential Information disclosed or produced by any party in this litigation are referred to as "Protected Documents." Except as otherwise indicated below, all documents or discovery responses designated by the producing party as "Confidential" and which are disclosed or produced to the attorney's for the other parties to this litigation are Protected Documents and are entitled to confidential treatment as described below.

2. Protected Documents shall not include (a) advertising materials, (b) materials that on their face show that they have been published to the general public, or (c) documents that have submitted to any governmental entity without request for confidential treatment.

3. At any time after the delivery of Protected Documents, counsel for the party or parties receiving the Protected Documents may challenge the Confidential designation of all or any portion thereof by providing written notice thereof to counsel for the party disclosing or producing the Protected Documents. If the parties are unable to agree as to whether the confidential designation of discovery material is appropriate, the party or parties receiving the Protected Documents shall certify to the Court that the parties cannot reach an agreement as to the confidential nature of all or a portion of the Protected Documents. Thereafter, the party or parties disclosing or producing the Protected Documents shall have ten (10) days from the date of certification to file a motion for protective order with regard to any Protected Documents in dispute. The party or parties producing the Protected Documents shall have

the burden of establishing that the disputed Protected Documents are entitled to confidential treatment. If the party or parties producing the Protected Documents do not timely file a motion for protective order, then the Protected Documents in dispute shall no longer be subject to confidential treatment as provided in this Order. All Protected Documents are entitled to confidential treatment pursuant to the terms of this Order until and unless the parties formally agree in writing to the contrary, a party fails to timely move for a protective order, or a contrary determination is made by the Court as to whether all or a portion of a Protected Document is entitled to confidential treatment.

4. Confidential Treatment. Protected Documents and any information contained therein shall not be used or shown, disseminated, copied, or in any way communicated to anyone for any purpose whatsoever, except as provided for below.

5. Protected Documents and any information contained therein shall be disclosed only to the following persons ("Qualified Persons"):

(a) Counsel of record in this action for the party or party receiving Protected Documents or any information contained therein;

(b) Employees of such counsel (excluding experts and investigators) assigned to and necessary to assist such counsel in the preparation and trial of this action; and

(c) The Court.

Protected Documents and any information contained therein shall be used solely for the prosecution of this litigation.

6. Counsel of record for the party or parties receiving Protected Documents may create an index of the Protected Documents and furnish it to attorneys of record representing or having represented parties involved in litigation involving the claims alleged in this suit against the party or parties disclosing or producing the Protected Documents. The index may only

identify the document, date, author, and general subject matter of any Protected Document, but may not reveal the substance of any such document. Counsel for the party or parties receiving Protected Documents shall maintain a current log of the names and addresses of persons to whom the index was furnished.

7. The term "copy" as used herein means any photographic, mechanical or computerized copy or reproduction of any document or thing, or any verbatim transcript, in whole or in part, of such document or thing.

8. To the extent that Protected Documents or information contained therein are used in depositions, at hearings, or at trial, such documents or information shall remain subject to the provisions of this Order, along with the transcript pages of the deposition testimony and/or trial testimony referring to the Protected Documents or information contained therein.

9. Any court reporter or transcriber who reports or transcribes testimony in this action shall agree that all "confidential" information designated as such under this Order shall remain "confidential" and shall not be disclosed by them, except pursuant to the terms of this Order, and that any notes or transcriptions of such testimony (and any accompanying exhibits) will be retained by the reporter or delivered to counsel of record.

10. Inadvertent or unintentional production of documents or information containing Confidential Information which are not designated "confidential" shall not be deemed a waiver in whole or in part of a claim for confidential treatment.

11. The party or parties receiving Protected Documents shall not under any circumstances sell, offer for sale, advertise, or publicize Protected Documents or any information contained therein.

12. After termination of this litigation, the provisions of this Order shall continue to be binding,

except with respect to those documents and information that become a matter of public record. This Court retains and shall have continuing jurisdiction over the parties and recipients of the Protected Documents for enforcement of the provisions of this Order following termination of this litigation.

13. Upon termination of this action by dismissal, judgment, or settlement, counsel for the party or parties receiving Protected Documents shall return the Protected Documents to the counsel for the party or parties disclosing or producing the Protected Documents. The party or parties receiving the Protected Documents shall keep their attorney work product which refers or relates to any Protected Documents. Attorney work product may be used in subsequent litigation provided that such use does not disclose Protected Documents or any information contained therein.

14. This Order shall be binding upon the parties and their attorneys, successors, executors, personal representatives, administrators, heirs, legal representatives, assigns, subsidiaries, divisions, employees, agents, independent contractors, or other persons or organizations over which they have control.

15. The Court anticipates and encourages the parties to file a motion to modify the terms hereof with respect to the sharing of Protected Documents with experts and consultants; shifting the cost burden of production equitably; and other terms that may be reasonably required to protect a party as provided in Rule 26(b) or (c) of the Federal Rules of Civil Procedure.

So ORDERED AND SIGNED this _____ day of _____, 2007.

_____

T. JOHN WARD
UNITED STATES DISTRICT JUDGE

APPENDIX C

ORDER RELATING TO PATENT CASES BEFORE JUDGE T. JOHN WARD

The Court issues certain modifications to the Eastern District Patent Rules. The modifications relate to three issues: (1) Notice Requirements, (2) Infringement and Invalidity Contentions for Software, and (3) Deadlines Related to Claim Construction.

I. Notice Requirements

The Court has seen a dramatic increase in the number of disputes related to parties serving "supplemental," "additional," or "revised" P.R. 3-1 or P.R. 3-3 disclosures. In the past, parties were not required to provide notice to the Court regarding compliance with P.R. 3-1 or P.R. 3-3. Thus, certain parties attempted to avoid the rule that Preliminary Contentions are final except as provided in P.R. 3-6 and P.R. 3-7. Accordingly, the Court modifies P.R. 3-1 and P.R. 3-3 in the following manner:

> **P.R. 3-1(g):** Any time a party claiming patent infringement serves Preliminary Infringement Contentions on an opposing party, the party claiming patent infringement shall also file with the Court a Notice of Compliance with P.R. 3-1.
>
> **P.R. 3-3(e):** Any time a party opposing patent infringement serves Preliminary Invalidity Contentions on an opposing party, the party opposing patent infringement shall also file with the Court a Notice of Compliance with P.R. 3-3.

Under this Court's interpretation of the Patent Rules, leave of Court is required for serving "amended," "supplemental," or "revised" P.R. 3-1 or P.R. 3-3 disclosures. The Court will strike "amendments," "supplements," or "revisions" of P.R. 3-1 or P.R. 3-3 disclosures that do not comply with P.R. 3-6 or P.R. 3-7.

II. Infringement and Invalidity Contentions for Software

Additional modifications to the Patent Rules regarding P.R. 3-1 and P.R. 3-3 are being made

to reduce discovery disputes and motion practice resulting from patents that contain software claim limitations. The Patent Rules require a party asserting claims of patent infringement to take a firm position in the litigation as it relates to infringement early on in the case. This and other courts in the Eastern District of Texas, however, recognize that software claim limitations present unique challenges for the parties because parties claiming patent infringement do not typically have access to an opposing party's source code before filing suit. At the same time, parties opposing a claim for patent infringement are hampered in their ability to prepare a defense absent specific infringement contentions from the party asserting claims of patent infringement.

The lack of access to source code coupled with an opponent's right to prepare a defense has led to numerous discovery disputes. To alleviate these disputes and to provide clear direction to the parties as to their rights and responsibilities under the Patent Rules, the Court modifies the Patent Rules in a manner consistent with such cases as *American Video Graphics, L.P. v. Electronic Arts, Inc.*, 359 F. Supp. 2d 558 (E.D. Tex. 2005).

The Court's modifications to P.R. 3-1and P.R. 3-3 are set out below.

> **P.R. 3-1 (h):** If a party claiming patent infringement asserts that a claim element is a software limitation, the party need not comply with P.R. 3-1 for those claim elements until 30 days after source code for each Accused Instrumentality is produced by the opposing party. Thereafter, the party claiming patent infringement shall identify, on an element-by-element basis for each asserted claim, what source code of each Accused Instrumentality allegedly satisfies the software limitations of the asserted claim elements.
>
> **P.R. 3-3(f):** If a party claiming patent infringement exercises the provisions of P.R. 3-1(g), the party opposing a claim of patent infringement may serve, not later than 30 days after receipt of a P.R. 3-1(g) disclosure, supplemental "Preliminary Invalidity Contentions" that amend only those claim elements identified as software limitations by the party claiming patent infringement.

Thus, if a party claiming patent infringement asserts that a claim element (or the entire claim) is software, that party need only identify the element as a software limitation in its initial compliance

with P.R. 3-1, but does not need to identify where such limitation is met in the Accused Instrumentality. After receipt of the source code for an Accused Instrumentality, the party is permitted 30 days to supplement its P.R. 3-1 disclosure to identify, with specificity, the source code of the Accused Instrumentality that allegedly satisfies the software claim elements. P.R. 3-1(g) does not allow Plaintiff the opportunity to modify or amend any non-software claim contentions.

Likewise, once a party opposing a claim of patent infringement is in receipt of a P.R. 3.1(g) disclosure, the party is allowed 30 days to modify its initial P.R. 3-3 disclosures, but only to the extent the modifications relate to the software claim elements identified by the party claiming patent infringement. P.R. 3-3(e) does not allow a party opposing a claim of infringement an opportunity to modify or amend any non-software contentions.

III. Claim Construction Deadlines

The final amendments to the Patent Rules relate to claim construction deadlines. In the Eastern District Patent Rules, claim construction deadlines are triggered by the filing of the parties' Infringement and Invalidity Contentions. The increase of patent cases before this Court has resulted in a large number of Claim Construction hearings and, as a result, strict application of the Patent Rules yields a P.R. 4-5 deadline approximately three months or more before Court could accommodate a Claim Construction Hearing.

To facilitate the case, resolve discovery disputes, and have claim construction hearings a reasonable time after briefing is complete, the Court modifies the deadlines in P.R. 4-1 and P.R. 4-3 as set forth below:

> **4-1. Exchange of Proposed Terms and Claim Elements for Construction.**
> **(a)** Not later than ***140 days before the date set for the Claim Construction Hearing***, each party shall simultaneously exchange a list of claim terms, phrases, or clauses which that party contends should be construed by the Court, and identify any claim element which that party contends should be governed by 35 U.S.C. § 112(6).

4-3. Joint Claim Construction and Prehearing Statement.
Not later than ***30 days after "Exchange of Preliminary Claim Constructions and Extrinsic Evidence" in compliance with P.R. 4.2***, the parties shall complete and file a Joint Claim Construction and Prehearing Statement, which shall contain the following information:

Thus, the Court's modifications will make the trigger of P.R. 4-1 through P.R. 4-5 the date of the Claim Construction Hearing. For clarification, the Court notes that the "140 days" set forth in P.R. 4-1 was not chosen to confuse the parties but was instead chosen so as to be evenly divisible by 7. Thus, whatever the date of the Claim Construction Hearing, the deadline for complying with P.R. 4-1 will always fall on a weekday. If that weekday is a Federal Holiday, the deadline for complying with P.R. 4-1 is extended to the first day that is not a Saturday, Sunday or other Federal Holiday.

EXHIBIT

3

IN THE UNITED STATES DISTRICT COURT
FOR THE EASTERN DISTRICT OF TEXAS
MARSHALL DIVISION

REMBRANDT TECHNOLOGIES, LP	§	
	§	
V.	§	CIVIL NO. 2:06-CV-224(TJW)
	§	
TIME WARNER CABLE, INC.	§	

**NOTICE OF SCHEDULING CONFERENCE,
PROPOSED DEADLINES FOR DOCKET CONTROL ORDER
AND DISCOVERY ORDER**

The court, *sua sponte*, issues this Notice of Scheduling Conference, Proposed Deadlines for Docket Control Order and Discovery Order.

Notice of Scheduling Conference

Pursuant to Fed. R. Civ. P. 16 and Local Rule CV-16, the Scheduling Conference in this case is set for **April 3, 2007, at 2:30 p.m. in Marshall, Texas.** The parties are directed to meet and confer in accordance with Fed. R. Civ. P. 26(f) prior to the conference. The parties are excused from the requirement of filing a written proposed discovery plan in this case.

Proposed Deadlines for Docket Control Order

The proposed deadlines for docket control order set forth in the attached Appendix A shall be discussed at the Scheduling Conference. The court will not modify the proposed trial date except for good cause shown.

Discovery Order

After a review of the pleaded claims and defenses in this action and in furtherance of the management of the court's docket under Fed. R. Civ. P. 16, it is ORDERED AS FOLLOWS:

1. **Disclosures.** Except as provided by paragraph 1(h), and, to the extent not already disclosed, within thirty (30) days after the Scheduling Conference, each party shall disclose to every

other party the following information:

(a) the correct names of the parties to the lawsuit;

(b) the name, address, and telephone number of any potential parties;

(c) the legal theories and, in general, the factual bases of the disclosing party's claims or defenses (the disclosing party need not marshal all evidence that may be offered at trial);

(d) the name, address, and telephone number of persons having knowledge of relevant facts, a brief statement of each identified person's connection with the case, and a brief, fair summary of the substance of the information known by any such person;

(e) any indemnity and insuring agreements under which any person or entity carrying on an insurance business may be liable to satisfy part or all of a judgment entered in this action or to indemnify or reimburse for payments made to satisfy the judgment;

(f) any settlement agreements relevant to the subject matter of this action;

(g) any statement of any party to the litigation;

(h) for any testifying expert, by the date set by the court in the Docket Control Order, each party shall disclose to the other party or parties:

a. the expert's name, address, and telephone number;

b. the subject matter on which the expert will testify;

c. if the witness is retained or specially employed to provide expert testimony in the case or whose duties as an employee of the disclosing party regularly involve giving expert testimony:

(a) all documents, tangible things, reports, models, or data compilations that have been provided to, reviewed by, or prepared by or for the

expert in anticipation of the expert's testimony; and

(b) the disclosures required by Fed. R. Civ. P. 26(a)(2)(B) and Local Rule CV-26.

d. for all other experts, the general substance of the expert's mental impressions and opinions and a brief summary of the basis for them or documents reflecting such information;

Any party may move to modify these disclosures for good cause shown.

2. **Protective Orders.** Upon the request of any party before or after the Scheduling Conference, the court shall issue the Protective Order in the form attached as Appendix B. Any party may oppose the issuance of or move to modify the terms of the Protective Order for good cause.

3. **Additional Disclosures.** In addition to the disclosures required in Paragraph 1 of this Order, at the Scheduling Conference, the court shall amend this discovery order and require each party, without awaiting a discovery request, to provide, to the extent not already provided, to every other party the following:

(a) the disclosures required by the Patent Rules for the Eastern District of Texas;

(b) within forty-five (45) days after the Scheduling Conference, a copy of all documents, data compilations, and tangible things in the possession, custody, or control of the party that are relevant to the case, except to the extent these disclosures are affected by the time limits set forth in the Patent Rules for the Eastern District of Texas. By written agreement of all parties, alternative forms of disclosure may be provided in lieu of paper copies. For example, the parties may agree to exchange images of documents electronically or by means of computer disk; or the parties may agree to

review and copy disclosure materials at the offices of the attorneys representing the parties instead of requiring each side to furnish paper copies of the disclosure materials;

(c) within forty-five (45) days after the Scheduling Conference, a complete computation of any category of damages claimed by any party to the action, making available for inspection and copying as under Rule 34, the documents or other evidentiary material on which such computation is based, including materials bearing on the nature and extent of injuries suffered; and

(d) within forty-five (45) days after the Scheduling Conference, those documents and authorizations described in Local Rule CV-34; and

The court shall order these disclosures in the absence of a showing of good cause by any party objecting to such disclosures.

4. **Discovery Limitations**. At the Scheduling Conference, the court shall also amend this discovery order to limit discovery in this cause to the disclosures described in Paragraphs 1 and 3 together with 60 interrogatories, 60 requests for admissions, the depositions of the parties, depositions on written questions of custodians of business records for third parties, depositions of three (3) expert witnesses per side and forty (40) hours of additional depositions per side. "Side" means a party or a group of parties with a common interest. Any party may move to modify these limitations for good cause.

5. **Privileged Information**. There is no duty to disclose privileged documents or information. However, the parties are directed to meet and confer concerning privileged documents or information after the Scheduling Conference. Within sixty (60) days after the Scheduling Conference, the parties shall exchange privilege logs identifying the documents or

information and the basis for any disputed claim of privilege in a manner that, without revealing information itself privileged or protected, with enable the other parties to assess the applicability of the privilege or protection. Any party may move the court for an order compelling the production of any documents or information identified on any other party's privilege log. If such a motion is made, the party asserting privilege shall respond to the motion within the time period provided by Local Rule CV-7. The party asserting privilege shall then file with the Court within thirty (30) days of the filing of the motion to compel any proof in the form of declarations or affidavits to support their assertions of privilege, along with the documents over which privilege is asserted for *in camera* inspection. If the parties have no disputes concerning privileged documents or information, then the parties shall inform the court of that fact within sixty (60) days after the Scheduling Conference.

6. **Pre-trial disclosures**. Absent a showing of good cause by any party, the court shall require the following additional disclosures:

Each party shall provide to every other party regarding the evidence that the disclosing party may present at trial as follows:

(a) The name and, if not previously provided, the address and telephone number, of each witness, separately identifying those whom the party expects to present at trial and those whom the party may call if the need arises.

(b) The designation of those witnesses whose testimony is expected to be presented by means of a deposition and, if not taken stenographically, a transcript of the pertinent portions of the deposition testimony.

(c) An appropriate identification of each document or other exhibit, including summaries of other evidence, separately identifying those which the party expects to offer and

those which the party may offer if the need arises.

Unless otherwise directed by the court, these disclosures shall be made at least 30 days before trial. Within 14 days thereafter, unless a different time is specified by the court, a party may serve and file a list disclosing (1) any objections to the use under Rule 32(a) of a deposition designated by another party under subparagraph (B), and (2) any objections, together with the grounds therefor, that may be made to the admissibility of materials identified under subparagraph (c). Objections not so disclosed, other than objections under Rules 402 and 403 of the Federal Rules of Evidence, shall be deemed waived unless excused by the court for good cause shown.

7. **Signature.** The disclosures required by this order shall be made in writing and signed by the party or counsel and shall constitute a certification that, to the best of the signer's knowledge, information and belief, such disclosure is complete and correct as of the time it is made. If feasible, counsel shall meet to exchange disclosures required by this order; otherwise, such disclosures shall be served as provided by Fed. R. Civ. P. 5. The parties shall promptly file a notice with the court that the disclosures required under this order have taken place.

8. **Duty to Supplement**. After disclosure is made pursuant to this order, each party is under a duty to supplement or correct its disclosures immediately if the party obtains information on the basis of which it knows that the information disclosed was either incomplete or incorrect when made, or is no longer complete or true.

9. **Disputes.**

(a) Except in cases involving claims of privilege, any party entitled to receive disclosures may, after the deadline for making disclosures, serve upon a party required to make disclosures a written statement, in letter form or otherwise, of any reason why the

party entitled to receive disclosures believes that the disclosures are insufficient. The written statement shall list, by category, the items the party entitled to receive disclosures contends should be produced. The parties shall promptly meet and confer. If the parties are unable to resolve their dispute, then the party required to make disclosures shall, within fourteen (14) days after service of the written statement upon it, serve upon the party entitled to receive disclosures a written statement, in letter form or otherwise, which identifies (1) the requested items that will be disclosed, if any, and (2) the reasons why any requested items will not be disclosed. The party entitled to receive disclosures may thereafter file a motion to compel.

(b) Counsel are directed to contact the chambers of the undersigned for any "hot-line" disputes before contacting the Discovery Hotline provided by Local Rule CV-26(e). If the undersigned is not available, the parties shall proceed in accordance with Local Rule CV-26(e).

10. **No Excuses.** A party is not excused from the requirements of this Discovery Order because it has not fully completed its investigation of the case, or because it challenges the sufficiency of another party's disclosures, or because another party has not made its disclosures. Absent court order to the contrary, a party is not excused from disclosure because there are pending motions to dismiss, to remand or to change venue.

11. **Filings.** Any filings in excess of twenty (20) pages, counsel is directed to provide a courtesy copy to Chambers, simultaneously with the date of filing.

12. **Modifications to Patent Rules.** The attached Appendix C applies to this case and supplements the Patent Rules for the Eastern District of Texas. These modifications are not intended to apply to any other case except as may be expressly provided by order of this Court.

SIGNED this 14th day of March, 2007.

T. John Ward

T. JOHN WARD
UNITED STATES DISTRICT JUDGE

APPENDIX A

PROPOSED DEADLINES FOR DOCKET CONTROL ORDER

PROPOSED DEADLINES TO BE DISCUSSED AT THE SCHEDULING CONFERENCE APRIL 3, 2007

Monday, August 4, 2008	Jury Selection - 9:00 a.m. in **Marshall, Texas**
July 24, 2008	Pretrial Conference - 11:00 a.m. in **Marshall, Texas**
July 21, 2008	Joint Pretrial Order, Joint Proposed Jury Instructions and Form of the Verdict.
July 21, 2008	**Motions in Limine (due three days before final Pre-Trial Conference).** Three (3) days prior to the pre-trial conference provided for herein, the parties shall furnish a copy of their respective Motions in Limine to the Court by facsimile transmission, **903/935-2295**. The parties are directed to confer and advise the Court on or before 3:00 o'clock p.m. the day before the pre-trial conference which paragraphs are agreed to and those that need to be addressed at the pre-trial conference. **The parties shall limit their motions in limine to those issues which, if improperly introduced into the trial of the cause, would be so prejudicial that the Court could not alleviate the prejudice with appropriate instruction(s).**
July 14, 2008	Response to Dispositive Motions (including *Daubert* motions)
July 7, 2008	**Notice of Request for Daily Transcript or Real Time Reporting of Court Proceedings.** If a daily transcript or real time reporting of court proceedings is requested for trial, the party or parties making said request shall file a notice with the Court and e-mail the Court Reporter, Susan Simmons, at lssimmons@yahoo.com.

June 27, 2008	For Filing Dispositive Motions and any other motions that may require a hearing (including *Daubert* motions) **Responses to dispositive motions filed prior to the dispositive motion deadline, including *Daubert* Motions, shall be due in accordance with Local Rule CV-7(e). Motions for Summary Judgment shall comply with Local Rule CV56.**
May 28, 2008	Defendant to Identify Trial Witnesses
May 14, 2008	Plaintiff to Identify Trial Witnesses
May 14, 2008	Discovery Deadline
_____	**30** Days after claim construction ruling Designate Rebuttal Expert Witnesses other than claims construction Expert witness report due Refer to Discovery Order for required information.
_____	**15** Days after claim construction ruling Comply with P.R. 3-8.
_____	**15** Days after claim construction ruling Party with the burden of proof to designate Expert Witnesses other than claims construction Expert witness report due Refer to Discovery Order for required information.
February 13, 2008	Claim construction hearing 9:00 a.m., **Marshall, Texas**.
January 22, 2008	Comply with P.R. 4-5(c).
January 14, 2008	Comply with P.R. 4-5(b).

December 31, 2007	Comply with P.R. 4-5(a).
December 7, 2007	Discovery deadline–claims construction issues
November 30, 2007	Respond to Amended Pleadings
November 16, 2007	Amend Pleadings **(It is not necessary to file a Motion for Leave to Amend before the deadline to amend pleadings except to the extent the amendment seeks to add a new patent in suit. It is necessary to file a Motion for Leave to Amend after November 16, 2007).**
November 16, 2007	Comply with P.R. 4-3.
October 16, 2007	Comply with P.R. 4-2.
September 26, 2007	Comply with P.R. 4-1.
May 18, 2007	Comply with P.R. 3-3.
June 4, 2007	Privilege Logs to be exchanged by parties (or a letter to the Court stating that there are no disputes as to claims of privileged documents).
May 3, 2007	Join Additional Parties
April 13, 2007	Comply with P.R. 3-1

To be discussed at Scheduling Conference	Mediation to be completed If the parties agree that mediation is an option, the Court will appoint a mediator or the parties will mutually agree upon a mediator. If the parties choose the mediator, they are to inform the Court by letter the name and address of the mediator. The courtroom deputy will immediately mail out a "mediation packet" to the mediator for the case. The mediator shall be deemed to have agreed to the terms of Court Ordered Mediation Plan of the United States District Court of the Eastern District of Texas by going forth with the mediation. General Order 99-2.
April 3, 2007	Scheduling Conference (All attorneys are directed to Local Rule CV-16 for scope of the Scheduling Conference).

The parties are directed to Local Rule CV-7(d), which provides in part that "[i]n the event a party fails to oppose a motion in the manner prescribed herein the court will assume that the party has no opposition." Local Rule CV-7(e) provides that a party opposing a motion has **12 days, in addition to any added time permitted under Fed. R. Civ. P. 6(e),** in which to serve and file a response and any supporting documents, after which the court will consider the submitted motion for decision.

OTHER LIMITATIONS

1. All depositions to be read into evidence as part of the parties' case-in-chief shall be **EDITED** so as to exclude all unnecessary, repetitious, and irrelevant testimony; **ONLY** those portions which are relevant to the issues in controversy shall be read into evidence.

2. The Court will refuse to entertain any motion to compel discovery filed after the date of this Order unless the movant advises the Court within the body of the motion that counsel for the parties have first conferred in a good faith attempt to resolve the matter. See Eastern District of Texas Local Rule CV-7(h).

3. The following excuses will not warrant a continuance nor justify a failure to comply with the discovery deadline:

   (a) The fact that there are motions for summary judgment or motions to dismiss pending;

(b) The fact that one or more of the attorneys is set for trial in another court on the same day, unless the other setting was made prior to the date of this order or was made as a special provision for the parties in the other case;

(c) The failure to complete discovery prior to trial, unless the parties can demonstrate that it was impossible to complete discovery despite their good faith effort to do so.

APPENDIX B

IN THE UNITED STATES DISTRICT COURT
FOR THE EASTERN DISTRICT OF TEXAS
MARSHALL DIVISION

REMBRANDT TECHNOLOGIES, LP	§	
	§	
V.	§	CIVIL NO. 2:06-CV-224(TJW)
	§	
TIME WARNER CABLE, INC.	§	

STANDARD PROTECTIVE ORDER

The Court, *sua sponte*, issues this Protective Order to facilitate document disclosure and production under the Local Rules of this Court and the Federal Rules of Civil Procedure. Unless modified pursuant to the terms contained in this Order, this Order shall remain in effect through the conclusion of this litigation.

In support of this order, the court finds that:

1. Documents or information containing confidential proprietary and business information and/or trade secrets ("Confidential Information") that bear significantly on the parties' claims or defenses is likely to be disclosed or produced during the course of discovery in this litigation;

2. The parties to this litigation may assert that public dissemination and disclosure of Confidential Information could severely injure or damage the party disclosing or producing the Confidential Information and could place that party at a competitive disadvantage;

3. Counsel for the party or parties receiving Confidential Information are presently without sufficient information to accept the representation(s) made by the party or parties producing Confidential Information as to the confidential, proprietary, and/or trade secret nature of such Confidential Information; and

4. To protect the respective interests of the parties and to facilitate the progress of disclosure and discovery in this case, the following Order should issue:

IT IS THEREFORE ORDERED THAT:

1. Documents or discovery responses containing Confidential Information disclosed or produced by any party in this litigation are referred to as "Protected Documents." Except as otherwise indicated below, all documents or discovery responses designated by the producing party as "Confidential" and which are disclosed or produced to the attorney's for the other parties to this litigation are Protected Documents and are entitled to confidential treatment as described below.

2. Protected Documents shall not include (a) advertising materials, (b) materials that on their face show that they have been published to the general public, or (c) documents that have submitted to any governmental entity without request for confidential treatment.

3. At any time after the delivery of Protected Documents, counsel for the party or parties receiving the Protected Documents may challenge the Confidential designation of all or any portion thereof by providing written notice thereof to counsel for the party disclosing or producing the Protected Documents. If the parties are unable to agree as to whether the confidential designation of discovery material is appropriate, the party or parties receiving the Protected Documents shall certify to the Court that the parties cannot reach an agreement as to the confidential nature of all or a portion of the Protected Documents. Thereafter, the party or parties disclosing or producing the Protected Documents shall have ten (10) days from the date of certification to file a motion for protective order with regard to any Protected Documents in dispute. The party or parties producing the Protected Documents shall have the burden of establishing that the disputed Protected Documents are entitled to confidential

treatment. If the party or parties producing the Protected Documents do not timely file a motion for protective order, then the Protected Documents in dispute shall no longer be subject to confidential treatment as provided in this Order. All Protected Documents are entitled to confidential treatment pursuant to the terms of this Order until and unless the parties formally agree in writing to the contrary, a party fails to timely move for a protective order, or a contrary determination is made by the Court as to whether all or a portion of a Protected Document is entitled to confidential treatment.

4. Confidential Treatment. Protected Documents and any information contained therein shall not be used or shown, disseminated, copied, or in any way communicated to anyone for any purpose whatsoever, except as provided for below.

5. Protected Documents and any information contained therein shall be disclosed only to the following persons ("Qualified Persons"):

(a) Counsel of record in this action for the party or party receiving Protected Documents or any information contained therein;

(b) Employees of such counsel (excluding experts and investigators) assigned to and necessary to assist such counsel in the preparation and trial of this action; and

(c) The Court.

Protected Documents and any information contained therein shall be used solely for the prosecution of this litigation.

6. Counsel of record for the party or parties receiving Protected Documents may create an index of the Protected Documents and furnish it to attorneys of record representing or having represented parties involved in litigation involving the claims alleged in this suit against the party or parties disclosing or producing the Protected Documents. The index may only identify the document, date, author, and general subject matter of any Protected Document,

but may not reveal the substance of any such document. Counsel for the party or parties receiving Protected Documents shall maintain a current log of the names and addresses of persons to whom the index was furnished.

7. The term "copy" as used herein means any photographic, mechanical or computerized copy or reproduction of any document or thing, or any verbatim transcript, in whole or in part, of such document or thing.

8. To the extent that Protected Documents or information contained therein are used in depositions, at hearings, or at trial, such documents or information shall remain subject to the provisions of this Order, along with the transcript pages of the deposition testimony and/or trial testimony referring to the Protected Documents or information contained therein.

9. Any court reporter or transcriber who reports or transcribes testimony in this action shall agree that all "confidential" information designated as such under this Order shall remain "confidential" and shall not be disclosed by them, except pursuant to the terms of this Order, and that any notes or transcriptions of such testimony (and any accompanying exhibits) will be retained by the reporter or delivered to counsel of record.

10. Inadvertent or unintentional production of documents or information containing Confidential Information which are not designated "confidential" shall not be deemed a waiver in whole or in part of a claim for confidential treatment.

11. The party or parties receiving Protected Documents shall not under any circumstances sell, offer for sale, advertise, or publicize Protected Documents or any information contained therein.

12. After termination of this litigation, the provisions of this Order shall continue to be binding, except with respect to those documents and information that become a matter of public

record. This Court retains and shall have continuing jurisdiction over the parties and recipients of the Protected Documents for enforcement of the provisions of this Order following termination of this litigation.

13. Upon termination of this action by dismissal, judgment, or settlement, counsel for the party or parties receiving Protected Documents shall return the Protected Documents to the counsel for the party or parties disclosing or producing the Protected Documents. The party or parties receiving the Protected Documents shall keep their attorney work product which refers or relates to any Protected Documents. Attorney work product may be used in subsequent litigation provided that such use does not disclose Protected Documents or any information contained therein.

14. This Order shall be binding upon the parties and their attorneys, successors, executors, personal representatives, administrators, heirs, legal representatives, assigns, subsidiaries, divisions, employees, agents, independent contractors, or other persons or organizations over which they have control.

15. The Court anticipates and encourages the parties to file a motion to modify the terms hereof with respect to the sharing of Protected Documents with experts and consultants; shifting the cost burden of production equitably; and other terms that may be reasonably required to protect a party as provided in Rule 26(b) or (c) of the Federal Rules of Civil Procedure.

So ORDERED AND SIGNED this _____ day of _____, 2007.

_____

T. JOHN WARD
UNITED STATES DISTRICT JUDGE

APPENDIX C

ORDER RELATING TO PATENT CASES BEFORE JUDGE T. JOHN WARD

The Court issues certain modifications to the Eastern District Patent Rules. The modifications relate to three issues: (1) Notice Requirements, (2) Infringement and Invalidity Contentions for Software, and (3) Deadlines Related to Claim Construction.

I. Notice Requirements

The Court has seen a dramatic increase in the number of disputes related to parties serving "supplemental," "additional," or "revised" P.R. 3-1 or P.R. 3-3 disclosures. In the past, parties were not required to provide notice to the Court regarding compliance with P.R. 3-1 or P.R. 3-3. Thus, certain parties attempted to avoid the rule that Preliminary Contentions are final except as provided in P.R. 3-6 and P.R. 3-7. Accordingly, the Court modifies P.R. 3-1 and P.R. 3-3 in the following manner:

> **P.R. 3-1(g):** Any time a party claiming patent infringement serves Preliminary Infringement Contentions on an opposing party, the party claiming patent infringement shall also file with the Court a Notice of Compliance with P.R. 3-1.
>
> **P.R. 3-3(e):** Any time a party opposing patent infringement serves Preliminary Invalidity Contentions on an opposing party, the party opposing patent infringement shall also file with the Court a Notice of Compliance with P.R. 3-3.

Under this Court's interpretation of the Patent Rules, leave of Court is required for serving "amended," "supplemental," or "revised" P.R. 3-1 or P.R. 3-3 disclosures. The Court will strike "amendments," "supplements," or "revisions" of P.R. 3-1 or P.R. 3-3 disclosures that do not comply with P.R. 3-6 or P.R. 3-7.

II. Infringement and Invalidity Contentions for Software

Additional modifications to the Patent Rules regarding P.R. 3-1 and P.R. 3-3 are being made

to reduce discovery disputes and motion practice resulting from patents that contain software claim limitations. The Patent Rules require a party asserting claims of patent infringement to take a firm position in the litigation as it relates to infringement early on in the case. This and other courts in the Eastern District of Texas, however, recognize that software claim limitations present unique challenges for the parties because parties claiming patent infringement do not typically have access to an opposing party's source code before filing suit. At the same time, parties opposing a claim for patent infringement are hampered in their ability to prepare a defense absent specific infringement contentions from the party asserting claims of patent infringement.

The lack of access to source code coupled with an opponent's right to prepare a defense has led to numerous discovery disputes. To alleviate these disputes and to provide clear direction to the parties as to their rights and responsibilities under the Patent Rules, the Court modifies the Patent Rules in a manner consistent with such cases as *American Video Graphics, L.P. v. Electronic Arts, Inc.*, 359 F. Supp. 2d 558 (E.D. Tex. 2005).

The Court's modifications to P.R. 3-1and P.R. 3-3 are set out below.

> **P.R. 3-1 (h):** If a party claiming patent infringement asserts that a claim element is a software limitation, the party need not comply with P.R. 3-1 for those claim elements until 30 days after source code for each Accused Instrumentality is produced by the opposing party. Thereafter, the party claiming patent infringement shall identify, on an element-by-element basis for each asserted claim, what source code of each Accused Instrumentality allegedly satisfies the software limitations of the asserted claim elements.

> **P.R. 3-3(f):** If a party claiming patent infringement exercises the provisions of P.R. 3-1(g), the party opposing a claim of patent infringement may serve, not later than 30 days after receipt of a P.R. 3-1(g) disclosure, supplemental "Preliminary Invalidity Contentions" that amend only those claim elements identified as software limitations by the party claiming patent infringement.

Thus, if a party claiming patent infringement asserts that a claim element (or the entire claim) is software, that party need only identify the element as a software limitation in its initial compliance

with P.R. 3-1, but does not need to identify where such limitation is met in the Accused Instrumentality. After receipt of the source code for an Accused Instrumentality, the party is permitted 30 days to supplement its P.R. 3-1 disclosure to identify, with specificity, the source code of the Accused Instrumentality that allegedly satisfies the software claim elements. P.R. 3-1(g) does not allow Plaintiff the opportunity to modify or amend any non-software claim contentions.

Likewise, once a party opposing a claim of patent infringement is in receipt of a P.R. 3.1(g) disclosure, the party is allowed 30 days to modify its initial P.R. 3-3 disclosures, but only to the extent the modifications relate to the software claim elements identified by the party claiming patent infringement. P.R. 3-3(e) does not allow a party opposing a claim of infringement an opportunity to modify or amend any non-software contentions.

III. Claim Construction Deadlines

The final amendments to the Patent Rules relate to claim construction deadlines. In the Eastern District Patent Rules, claim construction deadlines are triggered by the filing of the parties' Infringement and Invalidity Contentions. The increase of patent cases before this Court has resulted in a large number of Claim Construction hearings and, as a result, strict application of the Patent Rules yields a P.R. 4-5 deadline approximately three months or more before Court could accommodate a Claim Construction Hearing.

To facilitate the case, resolve discovery disputes, and have claim construction hearings a reasonable time after briefing is complete, the Court modifies the deadlines in P.R. 4-1 and P.R. 4-3 as set forth below:

> **4-1. Exchange of Proposed Terms and Claim Elements for Construction.**
> **(a)** Not later than ***140 days before the date set for the Claim Construction Hearing***, each party shall simultaneously exchange a list of claim terms, phrases, or clauses which that party contends should be construed by the Court, and identify any claim element which that party contends should be governed by 35 U.S.C. § 112(6).

4-3. Joint Claim Construction and Prehearing Statement.
Not later than ***30 days after "Exchange of Preliminary Claim Constructions and Extrinsic Evidence" in compliance with P.R. 4.2***, the parties shall complete and file a Joint Claim Construction and Prehearing Statement, which shall contain the following information:

Thus, the Court's modifications will make the trigger of P.R. 4-1 through P.R. 4-5 the date of the Claim Construction Hearing. For clarification, the Court notes that the "140 days" set forth in P.R. 4-1 was not chosen to confuse the parties but was instead chosen so as to be evenly divisible by 7. Thus, whatever the date of the Claim Construction Hearing, the deadline for complying with P.R. 4-1 will always fall on a weekday. If that weekday is a Federal Holiday, the deadline for complying with P.R. 4-1 is extended to the first day that is not a Saturday, Sunday or other Federal Holiday.

EXHIBIT

4

IN THE UNITED STATES DISTRICT COURT
FOR THE DISTRICT OF DELAWARE

REMBRANDT TECHNOLOGIES LP	:	
v.	:	Civil Action No. 06-635 GMS
CABLEVISION SYSTEMS CORP.	:	

COXCOM, INC.	:	
v.	:	Civil Action No. 06-721 GMS
REMBRANDT TECHNOLOGIES LP	:	

REMBRANDT TECHNOLOGIES LP	:	
v.	:	Civil Action No. 06-727 GMS
CBS CORPORATION	:	

REMBRANDT TECHNOLOGIES LP	:	
v.	:	Civil Action No. 06-729 GMS
NBC UNIVERSAL INC.	:	

REMBRANDT TECHNOLOGIES LP	:	
v.	:	Civil Action No. 06-730 GMS
ABC, INC.	:	

REMBRANDT TECHNOLOGIES LP	:	
v.	:	Civil Action No. 06-731 GMS
FOX ENTERTAINMENT GROUP, INC.	:	

ORDER STAYING CIVIL ACTIONS

WHEREAS, the above-captioned civil actions were filed in the United States District Court for the District of Delaware and assigned to the Honorable Gregory M. Sleet;

WHEREAS, on or about March 13, 2007, a Motion for Transfer and Consolidation of the Rembrandt Technologies LP Patent Litigation (the "Motion") was filed before the Judicial Panel on Multidistrict Litigation; and

WHEREAS, the court concludes that it is in the interest of justice and judicial economy to stay the above-captioned cases until the Motion is resolved;

IT IS HEREBY ORDERED that:

The above-captioned cases are hereby STAYED pending resolution of the Motion for Transfer and Consolidation currently pending before the Judicial Panel on Multidistrict Litigation.

March 26, 2007

/s/ Gregory M. Sleet
UNITED STATES DISTRICT JUDGE

EXHIBIT

5

IN THE UNITED STATES DISTRICT COURT
FOR THE EASTERN DISTRICT OF TEXAS
MARSHALL DIVISION

REMBRANDT TECHNOLOGIES, LP	§	
	§	
V.	§	CIVIL NO. 2:06-CV-47(TJW)
	§	
SHARP CORPORATION and	§	
SHARP ELECTRONICS CORP.	§	

DOCKET CONTROL ORDER

In accordance with the case scheduling conference held herein on the 20th day of February, 2007, it is hereby

ORDERED that the following schedule of deadlines is in effect until further order of this court:

Monday, June 2, 2008	Jury Selection - 9:00 a.m. in **Marshall, Texas**
May 22, 2008	Pretrial Conference - 9:30 a.m. in **Marshall, Texas**
May 16, 2008	Joint Pretrial Order, Joint Proposed Jury Instructions and Form of the Verdict.
May 19, 2008	Responses to motions in limine due
May 12, 2008	**Motions in Limine (due three days before final Pre-Trial Conference).** Three (3) days prior to the pre-trial conference provided for herein, the parties shall furnish a copy of their respective Motions in Liming to the Court by facsimile transmission, **903/935-2295.** The parties are directed to confer and advise the Court on or before 3:00 o'clock p.m. the day before the pre-trial conference which paragraphs are agreed to and those that need to be addressed at the pre-trial conference. **The**

parties shall limit their motions in limine to those issues which, if improperly introduced into the trial of the cause, would be so prejudicial that the Court could not alleviate the prejudice with appropriate instruction(s).

May 5, 2008 — Video Deposition Designation

May 2, 2008 — **Notice of Request for Daily Transcript or Real Time Reporting of Court Proceedings.** If a daily transcript or real time reporting of court proceedings is requested for trial, the party or parties making said request shall file a notice with the Court and e-mail the Court Reporter, Susan Simmons, at lssimmons@yahoo.com.

April 25, 2008 — Response to Dispositive Motions (including *Daubert* motions)[1]
Responses to dispositive motions filed prior to the dispositive motion deadline, including *Daubert* Motions, shall be due in accordance with Local Rule CV-7(e). Motions for Summary Judgment shall comply with Local Rule CV56.

April 11, 2008 — Deadline for Filing Dispositive Motions and any other motions that
may require a hearing (including *Daubert* motions)

April 18, 2008 — Mediation to be completed

April 11, 2008 — Parties to identify rebuttal witness

---

[1] The parties are directed to Local Rule CV-7(d), which provides in part that "[i]n the event a party fails to oppose a motion in the manner prescribed herein the court will assume that the party has no opposition." Local Rule CV-7(e) provides that a party opposing a motion has **12 days, in addition to any added time permitted under Fed. R. Civ. P. 6(e),** in which to serve and file a response and any supporting documents, after which the court will consider the submitted motion for decision.

April 4, 2008	Parties to identify trial witness on issues for which they bear the burden of proof
February 19, 2008	Plaintiff to Identify Trial Witnesses
April 4, 2008	Discovery Deadline
March 14, 2008, or 60 days after claim construction ruling, whichever date is later.	Designate Rebuttal Expert Witnesses other than claims construction Expert witness report due Refer to Discovery Order for required information.
February 15, 2008, or 30 days after claim construction ruling, whichever date is later.	Comply with P.R. 3-8.
February 15, 2008, or 30 days after claim construction ruling, whichever date is later.	Party with the burden of proof to designate Expert Witnesses other than claims construction Expert witness report due Refer to Discovery Order for required information.
November 20, 2007	Claim construction hearing 9:00 a.m., **Marshall, Texas.**
November 2, 2007	Submit technical tutorials to the Court.
October 26, 2007	Comply with P.R. 4-5(c).
October 19, 2007	Comply with P.R. 4-5(b).
October 5, 2007	Comply with P.R. 4-5(a).
September 12, 2007	Discovery deadline

September 5, 2007	Respond to Amended Pleadings
August 22, 2007	Amend Pleadings **(It is not necessary to file a Motion for Leave to Amend before the deadline to amend pleadings except to the extent the amendment seeks to add a new patent in suit. It is necessary to file a Motion for Leave to Amend after August 22, 2007).**
August 22, 2007	Comply with P.R. 4-3.
July 23, 2007	Comply with P.R. 4-2.
July 3, 2007	Comply with P.R. 4-1.
June 11, 2007	Privilege Logs to be exchanged by parties
April 27, 2007	Join Additional Parties
May 2, 2007	Comply with P.R. 3-3 and P.R. 3-4.
April 2, 2007	Comply with P.R. 3-1 and P.R. 3-2.

IT IS FURTHER ORDERED that the parties shall submit the name, address, telephone number, and fax number of an agreed mediator to the Court within thirty (30) days from the date of the Scheduling Conference. If the parties are unable to agree, the Court will appoint a mediator in the above referenced case.

OTHER LIMITATIONS

1. All depositions to be read into evidence as part of the parties' case-in-chief shall be **EDITED** so as to exclude all unnecessary, repetitious, and irrelevant testimony; **ONLY** those portions which are relevant to the issues in controversy shall be read into evidence.
2. The Court will refuse to entertain any motion to compel discovery filed after the date of this Order unless the movant advises the Court within the body of the motion that counsel for the parties have first conferred in a good faith attempt to resolve the matter. See Eastern District of Texas Local Rule CV-7(h).

3. The following excuses will not warrant a continuance nor justify a failure to comply with the discovery deadline:

   (a) The fact that there are motions for summary judgment or motions to dismiss pending;

   (b) The fact that one or more of the attorneys is set for trial in another court on the same day, unless the other setting was made prior to the date of this order or was made as a special provision for the parties in the other case;

   (c) The failure to complete discovery prior to trial, unless the parties can demonstrate that it was impossible to complete discovery despite their good faith effort to do so.

SIGNED this 8th day of March, 2007.

T. John Ward

T. JOHN WARD
UNITED STATES DISTRICT JUDGE

EXHIBIT

6

IN THE UNITED STATES DISTRICT COURT
FOR THE DISTRICT OF DELAWARE

COXCOM, INC. Plaintiff, v. REMBRANDT TECHNOLOGIES, LP Defendant.	C.A. No. 06-721-GMS

REMBRANDT TECHNOLOGIES, L.P.'S OPENING BRIEF IN SUPPORT OF ITS MOTION TO DISMISS PURSUANT TO FEDERAL RULE 12(b)(1)

WOMBLE CARLYLE SANDRIDGE & RICE, PLLC

George Pazuniak (# 478)
Kevin M. Baird (# 4219)
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Counsel for Rembrandt Technologies, LP

Dated: January 26, 2007

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INTRODUCTION AND SUMMARY OF THE ARGUMENT

On November 30, 2006, plaintiff CoxCom, Inc. ("CoxCom") filed the above-captioned Declaratory Judgment action against defendant Rembrandt Technologies, L.P. ("Rembrandt") seeking a judgment that U.S. Patent No. 5,008,903 ("the '903 patent") owned by Rembrandt is not infringed, invalid and/or unenforceable. However, CoxCom's action was filed without justification and should be dismissed.

Rembrandt never mentioned the '903 patent to CoxCom, much less threatened it with the '903 patent, before CoxCom filed this lawsuit. Even if the facts alleged by CoxCom were true, they do not meet the stringent legal standards required for finding declaratory judgment jurisdiction.

CoxCom does not (and cannot) allege sufficient facts supporting an objectively reasonable apprehension that Rembrandt would sue it on the '903 patent, as required for jurisdiction under the Declaratory Judgment Act, 28 U.S.C. § 2201. It is true that Rembrandt owns a large portfolio of patents and has brought enforcement actions with respect to some of those patents against selected infringers. Not even CoxCom, however, would argue that those facts alone can establish its right to sue Rembrandt based on declaratory judgment jurisdiction. Thus, CoxCom's argument essentially is that if Rembrandt owns the '903, and it has previously sued CoxCom on a different patent, and also sued others with respect to the '903, CoxCom is entitled to assume that Rembrandt intends to sue it on the '903, notwithstanding the lack of any evidence that it intends to do so. As a matter of law, this is insufficient to establish declaratory judgment jurisdiction.

Even assuming that CoxCom could somehow justify its apprehension of an imminent suit on the '903 patent, this Court should exercise its discretion in dismissing this case. CoxCom has the opportunity to assert its claims against the '903 patent in a case between Rembrandt and

CoxCom pending in the Eastern District of Texas involving four other patents, with the '903 having been added after CoxCom filed this action. It undoubtedly would be more efficient for the parties and the judicial system if the '903 patent is litigated in the Texas action, allowing the disputes between Rembrandt and CoxCom to be decided in a single case. For this independent reason, Rembrandt asks the Court to exercise its discretion in dismissing this case.

For these and the reasons that follow, Rembrandt respectfully requests that this Court dismiss this improper lawsuit pursuant to Rule 12(b)(1) of the Federal Rules of Civil Procedure and, alternatively, the Court's discretionary authority under the Declaratory Judgment Act.

FACTUAL BACKGROUND

The Parties. Rembrandt owns approximately 175 patents, a portion of which originated from the patent portfolio of AT&T Paradyne, which for decades was a leading innovator in the field of high speed digital communications systems. Engineers at AT&T Paradyne have been awarded hundreds of patents, many of which reflect seminal developments in the telecommunications field, including the '903 patent.

CoxCom is a cable service producer which offers various cable services to its subscribers including television, telephone and Internet services. (D.I. 1 at ¶ 6). The '903 patent generally relates to improved techniques for transmitting data over cable systems such as CoxCom's, and covers CoxCom's cable Internet services.

The Texas Litigation Against CoxCom. Prior to the filing of this action, on June 1, 2006, Rembrandt filed a complaint in the United States District Court for the Eastern District of Texas against three cable companies: Charter Communications, Inc. and its affiliate ("Charter"), CoxCom, Inc, and its affiliates ("CoxCom"), and Cablevision Systems Corporation and its affiliate ("Cablevision") (the "first action"). This was Rembrandt's first, and only, lawsuit

against CoxCom prior to this litigation. Rembrandt sued to enforce four of its AT&T Paradyne patents, but did not include the '903 patent. Discovery in that action has not yet begun.

On November 30, 2006, CoxCom filed this declaratory judgment action on one patent, the '903 patent. On the same day CoxCom filed this lawsuit, Rembrandt filed a second action against Charter and CoxCom in the Eastern District of Texas on four additional cable system patents; but again, that action ("the second action") did not include the '903 patent. Upon learning that CoxCom filed this declaratory judgment action on the '903 patent in Delaware, Rembrandt was forced, as a prophylactic measure, to amend its Complaint in the second action to include the '903 patent, which it did the next day, December 1, 2006. Thus, the second action against Charter and CoxCom in Texas, filed only hours after CoxCom's Delaware case, now includes the '903 patent in addition to the other four patents initially asserted in the case. Discovery in the second action has not yet begun either.

In summary, Rembrandt has two separate pending actions against CoxCom in Texas on two different sets of patents. The '903 patent was subsequently added to the second Texas action as a result of CoxCom's declaratory judgment action here. Of the nine patents presently at issue between the parties in these three cases, CoxCom's declaratory judgment action in Delaware includes only the '903 patent. All three cases are still in the preliminary stages and discovery has not yet begun in any of the cases between Rembrandt and CoxCom.

Rembrandt's Cable Patent Litigation Against Others. CoxCom's declaratory judgment action purports to rest, in part, on other lawsuits by Rembrandt against other companies. In addition to enforcing its patent rights against CoxCom, Rembrandt has sought similar redress against other cable companies. On September 13, 2006, Rembrandt sued Time Warner in Texas on five patents, including the '903 patent. Nevertheless, as noted above, no

action on the '903 was asserted against CoxCom. The litigation against Time Warner on the '903 patent was filed two and half months before CoxCom's declaratory judgment action.

Subsequently, on October 13, 2006, Rembrandt brought an action in Delaware against Cablevision on the same four patents brought against CoxCom in the first action plus the '903 patent. Again, no action on the '903 was asserted against CoxCom. This case was filed six weeks before CoxCom's declaratory judgment action.

Based on solely these facts, CoxCom alleges that it had an objectively reasonable apprehension that a lawsuit by Rembrandt on the '903 patent was imminent. (D.I. 1 at ¶ 19). Rembrandt never threatened to sue CoxCom on the '903 patent prior to this litigation and did not sue CoxCom on the '903 patent when it sued other companies on that patent. Despite the fact that CoxCom delayed two and a half months after Rembrandt sued Time Warner on the '903 and other patents,[1] and, that when CoxCom did bring this action, brought it only with respect to the '903, CoxCom now expects this Court to entertain this improper, and now duplicative, declaratory judgment action.

ARGUMENT

I. THE COURT LACKS DECLARATORY JUDGMENT JURISDICTION OVER COXCOM'S CLAIMS

A. Legal Standards for Declaratory Judgment Jurisdiction

1. CoxCom Has the Burden of Proof on This Legal Issue.

The declaratory judgment plaintiff bears the burden of proving the existence of facts underlying its allegations of the existence of an actual controversy. *Jervis B. Webb Co. v. S. Sys., Inc.*, 742 F.2d 1388, 1399 (Fed. Cir. 1984). "To constitute an actual controversy, the plaintiff

[1] CoxCom also knew that, notwithstanding Rembrandt's October 13, 2006 action against Cablevision, in the more than six weeks which preceded the filing of this action, Rembrandt had not sued it on the '903.

has the burden of establishing by a preponderance of the evidence, *inter alia*, that it has a reasonable apprehension that it will be sued." *Shell Oil Co. v. Amoco Corp.* 970 F.2d 885, 887 (Fed. Cir. 1992). Determination of the legal effect of the parties' conduct under this test is a matter of law for the Court to decide. *Id.* at 889.

2. CoxCom Had No Reasonable Apprehension of Suit on the '903.

Consistent with Article III of the Constitution, the Declaratory Judgment Act (the "Act") confers jurisdiction to federal courts only in cases of "actual controversy." 28 U.S.C. § 2201; *Gen-Prove, Inc. v. Vysis, Inc.*, 359 F.3d 1376, 1379 (Fed. Cir. 2004), *cert. dismissed*, 543 U.S. 941 (2004). The Act seeks to strike a delicate balance between enabling accused infringers to resolve uncertainty created by real threats from patentees, while at the same time protecting "quiescent patent owners against unwarranted litigation." *Teva Pharmaceuticals USA, Inc. v. Pfizer, Inc.*, 395 F.3d 1324, 1333 (Fed. Cir. 2005), *cert. denied*, 126 S. Ct. 473 (2005). Thus, the court must draw a "line between cases in which the parties have adverse interests and cases in which those adverse interests have ripened into a dispute that may properly be deemed a controversy." *EMC Corp. v. Norand Corp.*, 89 F.3d 807, 811 (Fed. Cir. 1996).

Accordingly, before a court may exercise jurisdiction over a declaratory judgment action, the Act requires an "actual controversy between the parties." *Id.* at 810. However, "more is required for an actual controversy than the existence of an adversely held patent. . . ." *Teva*, 395 at 1333. Federal Circuit law governs a court's review as to whether an actual controversy exists under the Declaratory Judgment Act when the underlying merits of an action involve patent infringement and/or validity. *Microchip Technology, Inc. v. Chamberlain Group, Inc.*, 441 F.3d 936, 941 (Fed. Cir. 2006). In making the determination of whether an actual controversy exists, the court must decide whether the defendant had a reasonable apprehension of suit and whether such apprehension was *objectively* reasonable. A "subjective apprehension of an infringement

suit is insufficient to satisfy the actual controversy requirement." *Indium Corp. v. Semi-Alloys, Inc.*, 781 F.2d 879, 883 (Fed. Cir. 1985). A two part test has been formulated by the Federal Circuit to determine whether an objectively reasonable apprehension of suit exists. There must be both:

> (1) an explicit threat or other action by the patentee which creates a reasonable apprehension on the part of the declaratory judgment plaintiff that it will face an infringement suit, and
>
> (2) present activity by the declaratory judgment plaintiff which could constitute infringement, or concrete steps taken with the intent to conduct such activity."

Teva, 395 at 1332.

For purposes of this Motion, only the first prong of this test is at issue; Rembrandt does not dispute that the second prong is met. It is also, however, beyond dispute that Rembrandt has never made an explicit threat to CoxCom regarding the '903 patent. Therefore, the only issue is whether CoxCom objectively had a reasonable apprehension of a lawsuit on the '903 patent that is legally cognizable under the Declaratory Judgment Act. In circumstances like this, the Federal Circuit has stated that when "the defendant's conduct, including its statements, falls short of an express charge, one must consider the 'totality of the circumstances' in determining whether that conduct meets the first prong of the test." *Arrowhead Indus. Water, Inc. v. Ecolochem, Inc.*, 846 F.2d 731, 736 (Fed. Cir. 1988). Furthermore, it has been clarified that a declaratory judgment plaintiff must not only have a reasonable apprehension that the patentee will sue it for infringement, but also that the lawsuit is "*imminent*." *Teva*, 395 at 1333 (emphasis original).[2]

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[2] Although the Supreme Court has recently commented on the Federal Circuit's "reasonable apprehension of an imminent suit test" as set forth in *Teva*, such commentary was dicta and neither *Teva* nor the reasonable apprehension test were overruled. *See Medimmune, Inc. v. Genentech, Inc.*, 549 U.S. – , fn.11, 81 U.S.P.Q. 2d 1225, fn.11 (Jan. 9, 2007). Furthermore, no new test was proposed and, therefore, the test set forth in *Teva* remains controlling law as to this issue.

3. Jurisdiction has to exist at the time of the filing of the complaint.

When analyzing the totality of the circumstances, "the court must test the existence of jurisdiction as of the time the complaint was filed." *Positec USA Inc. v. Milwaukee Electric Tool Corp.*, 2006 WL 2726728 (D. Del. 2006)[3] (citing *Lang v. Pacific Marine & Supply Co.*, 895 F.2d 761, 764 (Fed. Cir. 1990)). "Activities that occurred subsequent to the filing of the complaint may not be considered since jurisdiction, if it exists, must be established as of the date of the filing of the declaratory judgment action." *Millipore Corp. v. University Patents, Inc.*, 682 F. Supp. 227, 231 (D. Del. 1987) (citing *Jervis B. Webb Co. v. S. Sys., Inc.*, 742 F.2d 1388, 1398 (Fed. Cir. 1984)). Moreover, "even assuming [the existence of] an actual controversy, the exercise of a court's jurisdiction over a declaratory judgment action is discretionary." *Telectronics Pacing Sys., Inc. v. Ventritrex, Inc.*, 982 F.2d 1520, 1526 (Fed. Cir. 1992) (citations omitted).

In summary, to demonstrate that this Court has declaratory judgment jurisdiction, CoxCom must identify specific acts by Rembrandt prior to the initiation of this lawsuit that would have led an objective observer to the reasonable conclusion that a lawsuit by Rembrandt on the '903 patent was imminent. The facts of this case do not meet this legal threshold and, therefore, CoxCom's case must be dismissed.

B. Rembrandt Never Threatened CoxCom on the '903 Patent

CoxCom does not allege, and it cannot be argued, that Rembrandt ever explicitly threatened CoxCom or any of its affiliates with litigation on the '903 patent prior to the filing of this action. There had been no communications between the parties regarding the '903 patent prior to this lawsuit, and CoxCom does not allege that any other actions by Rembrandt could be

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[3] Unpublished decisions cited to are attached hereto as Exhibit A.

construed as an express threat. Thus, where there is no express charge of infringement, as in this case, the Court must consider the totality of the circumstances to determine whether reasonable apprehension of an imminent suit existed. *Arrowhead*, 846 F.2d at 736.

C. The Totality of the Circumstances Shows No Reasonable Apprehension of an Imminent Suit

In the absence of an express threat of litigation, CoxCom cites three alleged factors in support of its contention that it feared an imminent infringement suit by Rembrandt on the '903 patent when it filed this case: (1) Rembrandt's business is to initiate lawsuits to enforce its patent rights; (2) Rembrandt previously sued CoxCom on other patents; and (3) Rembrandt previously sued CoxCom's competitors, but not CoxCom, on the '903 patent.

Under the totality of the circumstances, even if true, these factors fall far short of objectively giving rise to a reasonable apprehension of an imminent lawsuit on the '903 patent against CoxCom. Indeed, the evidence pointed in the opposite direction. Therefore, this action should be dismissed.

1. Rembrandt's Business.

In its complaint, CoxCom alleges that "Rembrandt's business is to initiate lawsuits to enforce patent rights." (*See, e.g.*, D.I. 1 at ¶¶ 7-14). In fact, Rembrandt is very selective regarding which patents it enforces and against which defendants it brings suit. In any event, even if relevant, CoxCom's characterization of Rembrandt's business is legally insufficient to support its position that it had a reasonable apprehension of imminent suit based on the '903. As noted earlier, declaratory judgment jurisdiction cannot be based on the mere fact that Rembrandt owns the '903, and that part of its business is to enforce certain of its patents against selected defendants.

Federal courts faced with CoxCom's type of argument have consistently held that the mere fact that a company vigorously protects its intellectual property is legally insufficient to create a reasonable apprehension of imminent litigation. *See, e.g., Teva Pharmaceuticals USA, Inc. v. Pfizer, Inc.*, 395 F.3d 1324, 1333 (Fed. Cir. 2005).[4] This policy is sound because to allow a company which lawfully enforces its patent rights to be subject to unfettered declaratory judgment jurisdiction by parties it has not threatened on the patent at issue, would do violence to the purpose and spirit of the Declaratory Judgment Act.

The mere fact that Rembrandt has previously asserted its patent rights against infringers is insufficient as a matter of law to justify a reasonable apprehension of imminent suit by CoxCom. In light of the totality of the circumstances of this case, this Court should give this factor little, if any, weight.

2. Rembrandt's Prior Suit Against CoxCom.

Next, CoxCom contends that Rembrandt's June 1, 2006 lawsuit in Texas supports its allegation that it feared an imminent threat of suit on the '903 patent.[5] In fact, that lawsuit should have led CoxCom to the opposite conclusion. The June 1, 2006 case against CoxCom, filed nearly 6 months before this case, was directed to four completely different patents. As the

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[4] *West Interactive Corp. v. First Data Resources, Inc.*, 972 F.2d 1295, 1298 (Fed. Cir. 1992); *Angiodynamics, Inc. v. Diomed Holdings, Inc.*, 2006 WL 2583107 at *3 (D. Del. Sept. 7, 2006); *Fairplay Electric Cars, LLC v. Textron Innovations, Inc.*, 431 F. Supp. 2d 491, 493 (D. Del. 2006); *Sirius Satellite Research, Inc. v. Acacia Research Corp.*, 2006 WL 238999 at *6 (S.D.N.Y. Jan. 30, 2006) ("the fact that a patentee has aggressively asserted its patent rights against other alleged infringers is not sufficient to create a reasonable apprehension of imminent litigation.").

[5] Although Rembrandt filed a second action against CoxCom in Texas, on four patents other than the '903, this second action was filed after CoxCom's declaratory judgment action and, therefore, as a matter of law is legally irrelevant. *West Interactive Corp. v. First Data Resources, Inc.*, 972 F.2d 1295, 1297 (Fed. Cir. 1992) ("This court applies this objective test to the facts at the time the complaint is filed.").

District Court for the Eastern District of Pennsylvania recently has stated, "a prior history of litigation [between the parties] is not necessarily relevant to the determination at all." *Peregrine Surgical, Ltd. v. Synergentics, USA, Inc.*, 2006 WL 3857492 at *4 (E.D. Pa. Dec. 29, 2006). In dismissing plaintiff's declaratory judgment action, the court in *Peregrine* stated that the "fact that a company has engaged in prior litigation over other patents does not produce a reasonable apprehension of suit in the instant case." *Id.* (citing *Glaxo Group, Ltd. v. Dr. Reddy s Labs., Ltd.*, 325 F. Supp. 2d 502, 507 (D.N.J. 2004) ("the fact that Glaxo has previously exhibited litigious tendencies with respect to other patents does not produce a reasonable apprehension of litigation in this case.")). Similarly, in *Moore U.S.A. Inc. v. The Standard Register Co.*, the district court held that even as many as three previous lawsuits between the parties in the last five years on related subject matter was insufficient, without more, to find a reasonable apprehension of an imminent suit. 2001 WL 34076423 (N.D.N.Y. Aug. 28, 2001).[6]

In this case, the mere fact that Rembrandt had filed one previous lawsuit against CoxCom on four other patents does not even come close to the type of conduct that satisfies the legal requirements for declaratory judgment jurisdiction. Declaratory judgment jurisdiction usually is found where a patentee holds the threat of litigation over an accused infringer's head for tactical or business purposes. *See Arrowhead*, 846 F.2d at 736. Here, even after filing its initial lawsuit, Rembrandt never threatened CoxCom with any additional patents, it did not contact any of

[6] *See also, Black & Decker Inc. v. Robert Bosch Tool Corp.*, 371 F. Supp. 2d 965 (N.D. Ill. 2005); *Progressive Technology in Lighting Inc. v. Lumatech Corp.*, 45 U.S.P.Q. 2d 1928, 1933 (W.D. Mich. 1998) (prior litigation between parties even with other facts present not enough for declaratory judgment jurisdiction); *Ryko Mnfct. Co. v. Delta Services and Equipment Corp.*, 28 U.S.P.Q. 2d 1558 (E.D. La. 1993) (same).

CoxCom's customers or suppliers about any potential infringement,[7] nor did it issue any press releases or make any public statements to indicate that it intended to sue CoxCom on the '903, or any other patent.[8]

The Federal Circuit, as well as many district courts, have held that the mere fact that there is a litigation history between two parties, particularly where it only comprises one prior case, does not give rise to declaratory judgment jurisdiction on any other patents owned by the plaintiff. A contrary policy would open the floodgates to unjustified litigation and allow all defendants to use the Declaratory Judgment Act as a weapon against patentees in clear contradiction to the purposes of the Act. *See Teva Pharmaceuticals USA, Inc. v. Pfizer, Inc.*, 395 F.3d 1324, 1333 (Fed. Cir. 2005).

3. Rembrandt's Suits Against Others on the '903 Patent.

Finally, CoxCom alleges that Rembrandt's previous lawsuits against Time Warner and Cablevision on the '903 patent have put it under a "real and immediate apprehension of suit on the '903 patent." (D.I. 1 at ¶19). CoxCom reasons that because Rembrandt accused Time Warner and Cablevision's high speed Internet services of infringing the '903 patent, CoxCom would be accused as well since it also provides high speed Internet services. However, both Rembrandt and CoxCom's conduct shows convincingly that CoxCom had no objective basis for believing that it was threatened with a lawsuit on the '903.

First, Rembrandt's own actions illustrate that CoxCom had no objectively reasonable fear of an imminent lawsuit based on the suits against others. The very fact that other cable companies, and not CoxCom, were sued on the '903, logically should have caused CoxCom to

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[7] *See, e.g., Microchip Technology, Inc. v. Chamberlain Group, Inc.*, 441 F.3d 936, 941 (Fed. Cir. 2006); *Vanguard Research, Inc. v. PEAT, Inc.*, 304 F.3d 1249, 1255 (Fed. Cir. 2002).

[8] *See, e.g., Comcast Cable Comm. Corp. v. Finisar Corp.*, 2006 WL 3259000, *3 (N.D.Cal. Nov. 9, 2006).

assume that it was not going to be sued on the '903, particularly when no suit was filed against it on that patent in the six week period before it filed this action. Moreover, Rembrandt filed its case against Time Warner on the '903 patent on September 13, 2006. In that September action against Time Warner, Rembrandt, in addition to the '903 patent, asserted four patents against Time Warner that had never been asserted against CoxCom. If Rembrandt's action against Time Warner, in fact, caused CoxCom to fear imminent suit, then CoxCom would have filed a declaratory action against Rembrandt on all five patents that were asserted against Time Warner. CoxCom does not explain why the alleged imminent fear related solely to the '903. The obvious explanation is that CoxCom did not file suit on the five patents because Rembrandt's action against Time Warner did not put CoxCom in any fear of imminent suit on any of the five patents asserted by Rembrandt against Time Warner, including the '903 patent.

As a matter of law, the mere fact that Rembrandt sued a competitor of CoxCom on a different group of patents does not provide an objective basis for CoxCom to believe that it would be sued on the '903 patent. *Indium Corp. of Am. v. Semi-Alloys, Inc.*, 781 F.2d 879, 883 (Fed. Cir. 1985) ("The prior patent litigation initiated by [defendant] against two other parties unconnected with [plaintiff], was too remote to make [plaintiff's] apprehension of further litigation in 1982 reasonable, insofar as necessary to give standing to bring a declaratory action on that basis.").[9] *See Mylan Pharmaceuticals, Inc. v. Merck & Co., Inc.*, 2005 WL 2850137 at *6 (M.D. Pa. Oct. 28, 2005). A patentee's history of enforcing patents does not in and of itself provide any indication regarding the patentee's intentions regarding other patents. *See Mutual Pharm. Co. v. Pfizer Inc.*, 307 F. Supp. 2d 88, 93-94 (D.D.C. 2004). For the same reasons,

[9] *See also, West Interactive Corp. v. First Data Resources, Inc.*, 972 F.2d 1295, 1298 (Fed. Cir. 1992) (holding defendant's litigation against unrelated third parties did not give plaintiff an objective reason to fear litigation).

Rembrandt's October 13, 2006 lawsuit against Cablevision in Delaware does not objectively support CoxCom's alleged apprehension of imminent suit.

CoxCom's substantial delay in doing anything in response to Rembrandt actions also belies CoxCom's claim now that those actions put CoxCom in fear of an immediate suit on the '903. Rembrandt filed its original suit against CoxCom on July 1, 2006. In the six months before it filed this declaratory judgment action, CoxCom did nothing. Rembrandt sued Time Warner on the '903 patent on September 13, 2006. In response to this, CoxCom again did nothing for over two and a half months. Finally, Rembrandt filed its suit against Cablevision on the '903 patent on October 13, 2006. Once again, for over six weeks CoxCom did nothing. *Holley Performance Products, Inc. v. Barry Grant, Inc.*, 74 U.S.P.Q. 2d 1357 (N.D. Ill. 2004) (Fear of lawsuit dissipated when declaratory judgment plaintiff did nothing during the two week deadline set by patentee for response to infringement allegations.); *Citizen Electronics Co., Ltd. v. Osram GMBH*, 377 F. Supp. 2d 149 (D.D.C. 2005) (case dismissed where plaintiff's delay indicated no apprehension of imminent suit.

In this case, the objective facts demonstrate that CoxCom did not have a reasonable apprehension of suit on the '903 patent. In fact, even when Rembrandt filed its second action against CoxCom without yet knowing about the declaratory judgment action, it did not assert the '903 patent against CoxCom. CoxCom simply cannot meet its burden of proving that the facts here put it in imminent apprehension of a lawsuit and, therefore, its complaint must be dismissed.

II. EVEN IF THE COURT HAS JURISDICTION, IT SHOULD NEVERTHELESS DISMISS THIS CASE IN THE EXERCISE OF ITS DISCRETION UNDER THE DECLARATORY JUDGMENT ACT

Even if the Court were to find subject matter jurisdiction here, it can and should dismiss this case in the exercise of its discretion under the Declaratory Judgment Act. The Act provides federal courts with a "unique breadth of . . . discretion to decline to enter a declaratory

judgment." *Wilton v. Seven Falls*, 515 U.S. 277, 287 (1995); *see also, Breitigan v. New Castle County*, 350 F. Supp. 2d 571, 582 (D. Del. 2004) (The Act "confers a discretion on the courts rather than an absolute right upon the litigant.").

In deciding whether to exercise its discretion, courts should consider whether hearing a declaratory judgment action would further the objectives of the Act. "Simply because there is an actual controversy between the parties does not mean that the district court is required to exercise that jurisdiction." *EMC Corp. v. Norand Corp.*, 89 F.3d 807, 813 (Fed. Cir. 1996). An action evidently filed "as a tactical measure," rather than to resolve a true cloud of litigation, is an appropriate candidate for discretionary dismissal. *Id.* at 815. The Federal Circuit has described the purpose of the Declaratory Judgment Act to prevent a scenario where

> a patent owner engages in a *danse macabre*, brandishing a Damoclean threat with a sheathed sword . . . . Guerilla-like, the patent owner attempts extra-judicial patent enforcement with scare-the-customer-and-run tactics that infect the competitive environment of the business community with uncertainty and insecurity.

Arrowhead, 846 F.2d at 734-35.

In this case, no evidence exists that Rembrandt has engaged in any extra-judicial patent enforcement or such a *danse macabre*. In fact, Rembrandt has never contacted CoxCom or any of its affiliates or customers regarding the '903 patent or attempted to coerce or hinder CoxCom with any "cloud of litigation." Rather, it is CoxCom's own actions than have multiplied the number of cases between the parties.

Moreover, the broader patent dispute between these two parties, including the '903 patent, is already being addressed in the Eastern District of Texas. Now that Rembrandt has added the '903 patent to its second action against CoxCom in Texas, there is no conceivable purpose for this lawsuit to continue. CoxCom will have a full and fair opportunity to present its

case against the '903 patent in conjunction with its already pending case including Rembrandt's other patents in Texas. Since discovery has not begun in any of these cases, there can be no prejudice to either party.

Given the facts of this case, it is evident that CoxCom's action does nothing to further the purposes of the Declaratory Judgment Act. Entertaining this case would simply be a waste of the judicial resources of this District and provides no benefit to either party. This is surely not the type of conduct the Act was created to guard against. On this independent basis, this action should be dismissed.

CONCLUSION

Because declaratory judgment jurisdiction is lacking for the reasons set forth above, CoxCom's improperly filed Complaint should be dismissed.

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Dated: January 26, 2007

CERTIFICATE OF SERVICE

I hereby certify that on January 26, 2007, I electronically filed the foregoing document with the Clerk of the Court using CM/ECF and caused the same to be served on the plaintiff at the following address in the manner indicated below:

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EXHIBIT

7

US005550863A

United States Patent [19]

Yurt et al.

[11] Patent Number: 5,550,863

[45] Date of Patent: * Aug. 27, 1996

[54] **AUDIO AND VIDEO TRANSMISSION AND RECEIVING SYSTEM**

[75] Inventors: **Paul Yurt**, Scottsdale, Ariz.; **H. Lee Browne**, Two Soundview Dr., Greenwich, Conn. 06830

[73] Assignee: **H. Lee Browne**, Greenwich, Conn.

[*] Notice: The portion of the term of this patent subsequent to Jul. 21, 2009, has been disclaimed.

[21] Appl. No.: **133,982**

[22] Filed: **Oct. 8, 1993**

Related U.S. Application Data

[63] Continuation of Ser. No. 862,508, Apr. 2, 1992, Pat. No. 5,253,275, which is a continuation of Ser. No. 637,562, Jan. 7, 1991, Pat. No. 5,132,992.

[51] **Int. Cl.**[6] **H04B 1/66**

[52] **U.S. Cl.** **375/240**; 375/219; 375/377; 348/7; 348/8; 348/10; 348/384; 455/3.1; 455/4.2

[58] **Field of Search** 375/122, 219, 375/259, 277, 240; 455/5.1, 4.1, 4.2, 3.1, 6.3; 358/86, 102; 360/14.1, 19.1; 348/384–387, 6, 7, 8, 10

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Primary Examiner—Stephen Chin
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Attorney, Agent, or Firm—Finnegan, Henderson, Farabow, Garrett & Dunner

[57] **ABSTRACT**

A system of distributing video and/or audio information employs digital signal processing to achieve high rates of data compression. The compressed and encoded audio and/or video information is sent over standard telephone, cable or satellite broadcast channels to a receiver specified by a subscriber of the service, preferably in less than real time, for later playback and optional recording on standard audio and/or video tape.

19 Claims, 12 Drawing Sheets

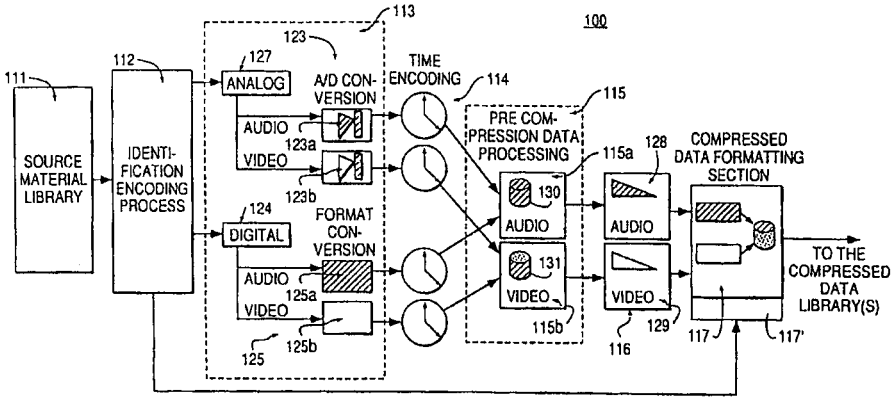

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FIG. 1a

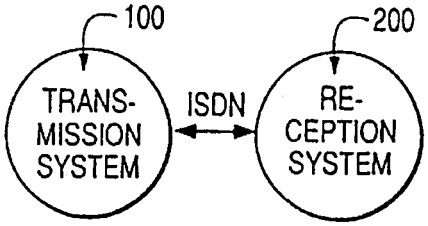


FIG. 1b

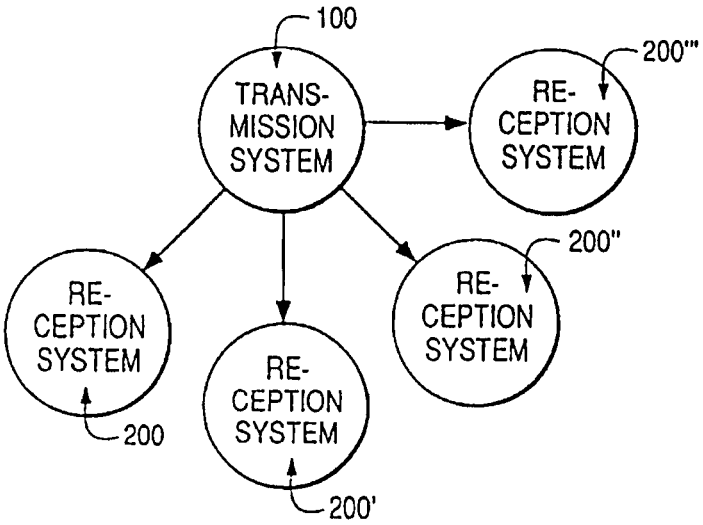
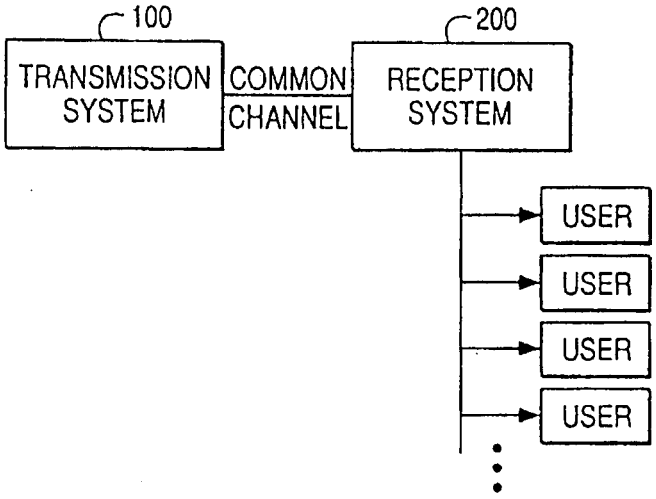


FIG. 1d



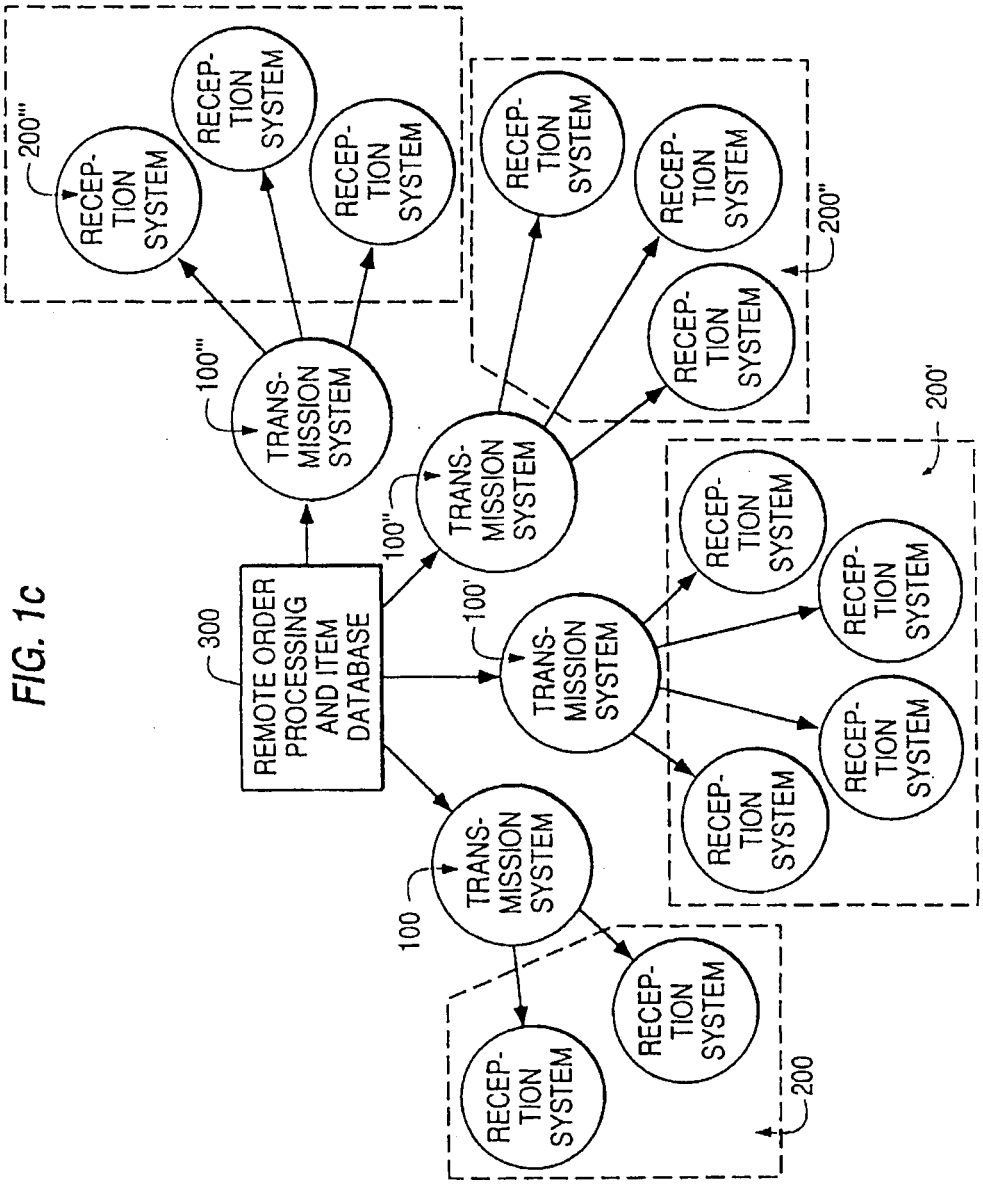

RECEP-TION SYSTEM
200'''
TRANS-MISSION SYSTEM
100'''
200''
100''
200'
100'
REMOTE ORDER PROCESSING AND ITEM DATABASE
300
100
200

FIG. 1c

FIG. 1e

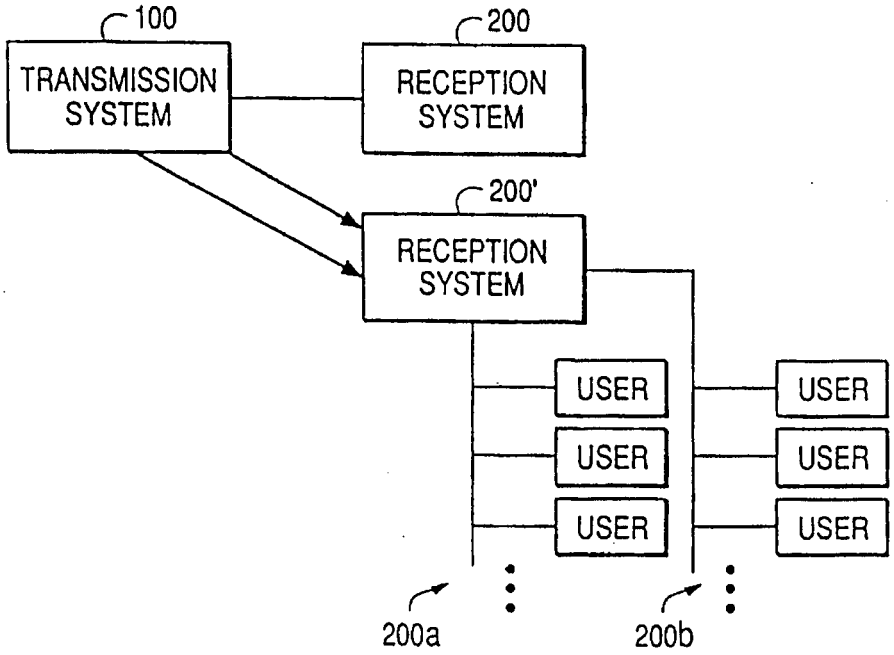

100
TRANSMISSION SYSTEM
200
RECEPTION SYSTEM
200'
RECEPTION SYSTEM
USER
USER
USER
USER
USER
USER
200a
200b

FIG. 1f

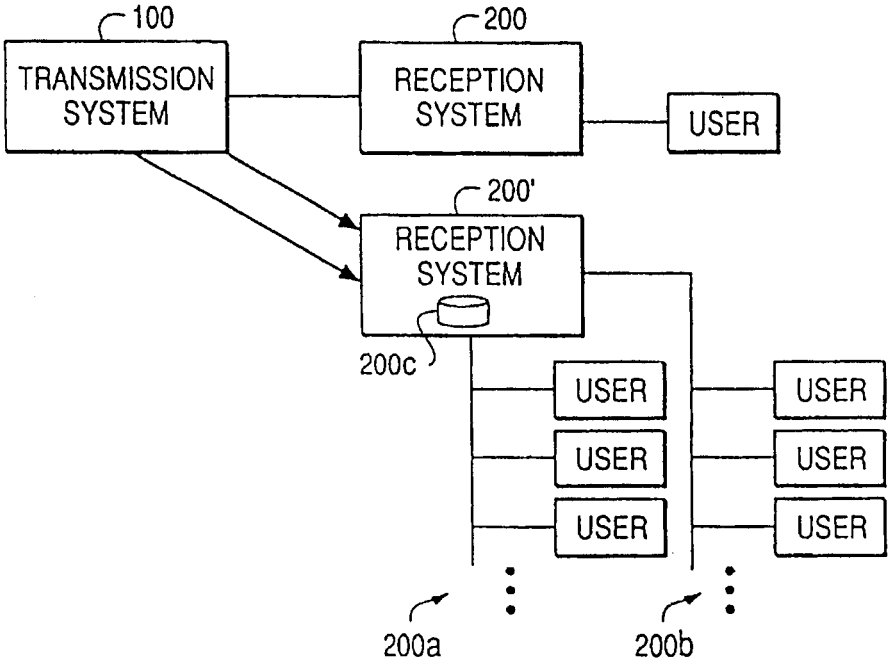

100
TRANSMISSION SYSTEM
200
RECEPTION SYSTEM
USER
200'
RECEPTION SYSTEM
200c
USER
USER
USER
USER
USER
USER
200a
200b

FIG. 1g

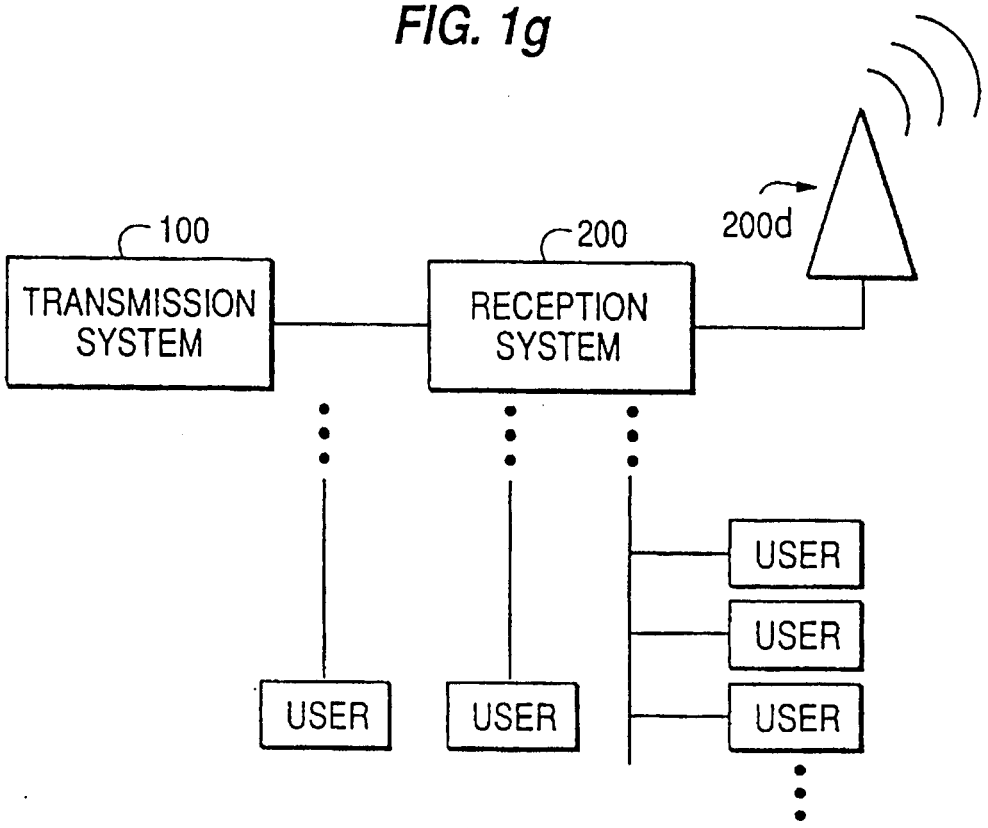
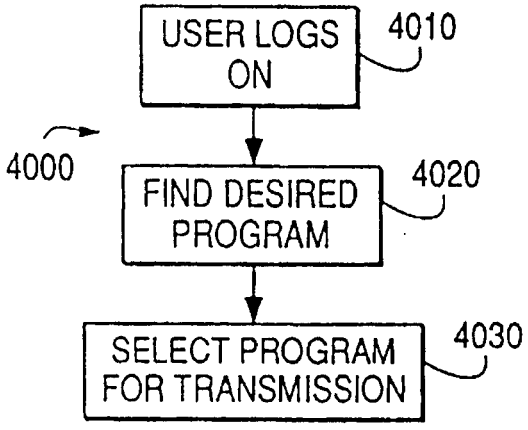

100
TRANSMISSION SYSTEM
200
RECEPTION SYSTEM
200d
USER
USER
USER
USER
USER

FIG. 4


USER LOGS ON
4010
4000
FIND DESIRED PROGRAM
4020
SELECT PROGRAM FOR TRANSMISSION
4030

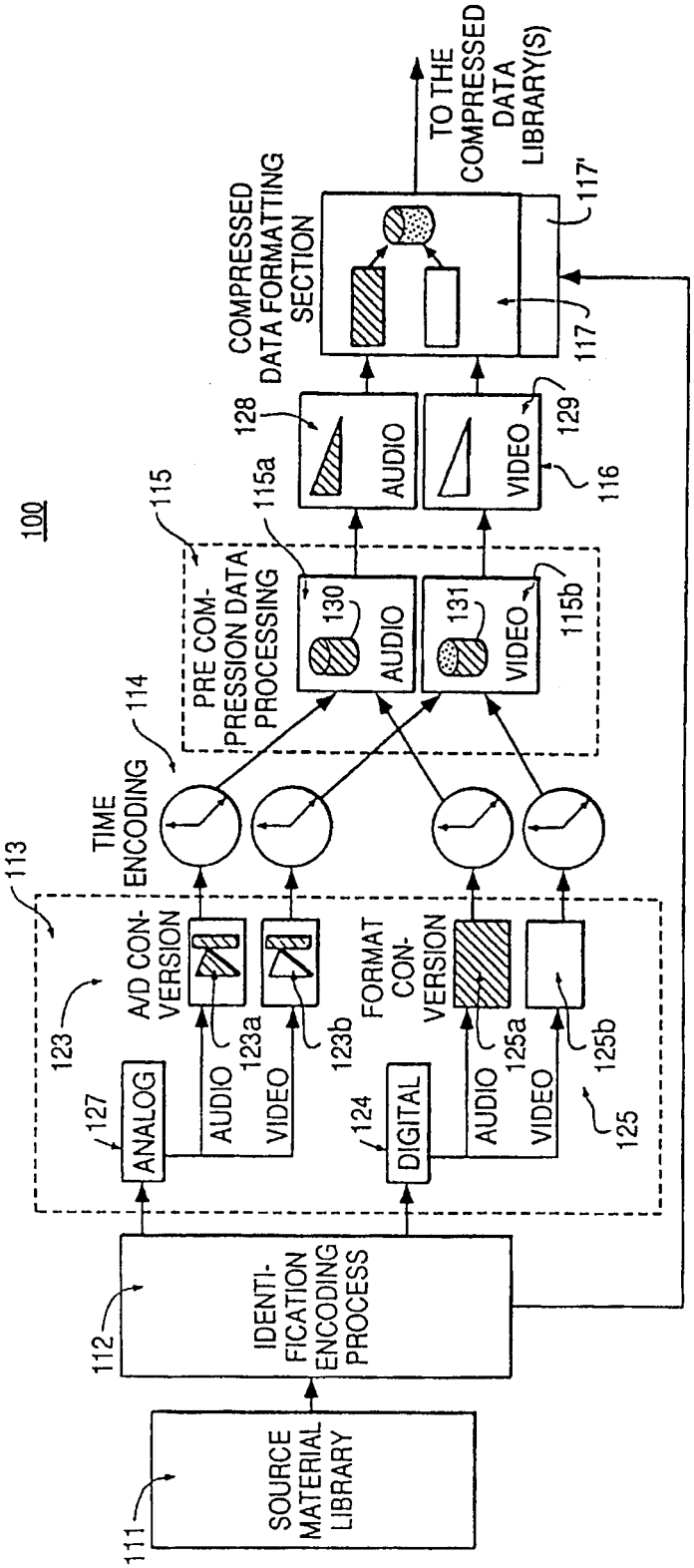

100
111
SOURCE MATERIAL LIBRARY
112
IDENTI-FICATION ENCODING PROCESS
113
123
A/D CON-VERSION
123a
123b
AUDIO
VIDEO
127
ANALOG
124
DIGITAL
FORMAT CON-VERSION
125a
125b
AUDIO
VIDEO
125
TIME ENCODING
114
PRE COM-PRESSION DATA PROCESSING
115
115a
115b
130
AUDIO
131
VIDEO
128
AUDIO
129
VIDEO
116
COMPRESSED DATA FORMATTING SECTION
117
117'
TO THE COMPRESSED DATA LIBRARY(S)

FIG. 2a

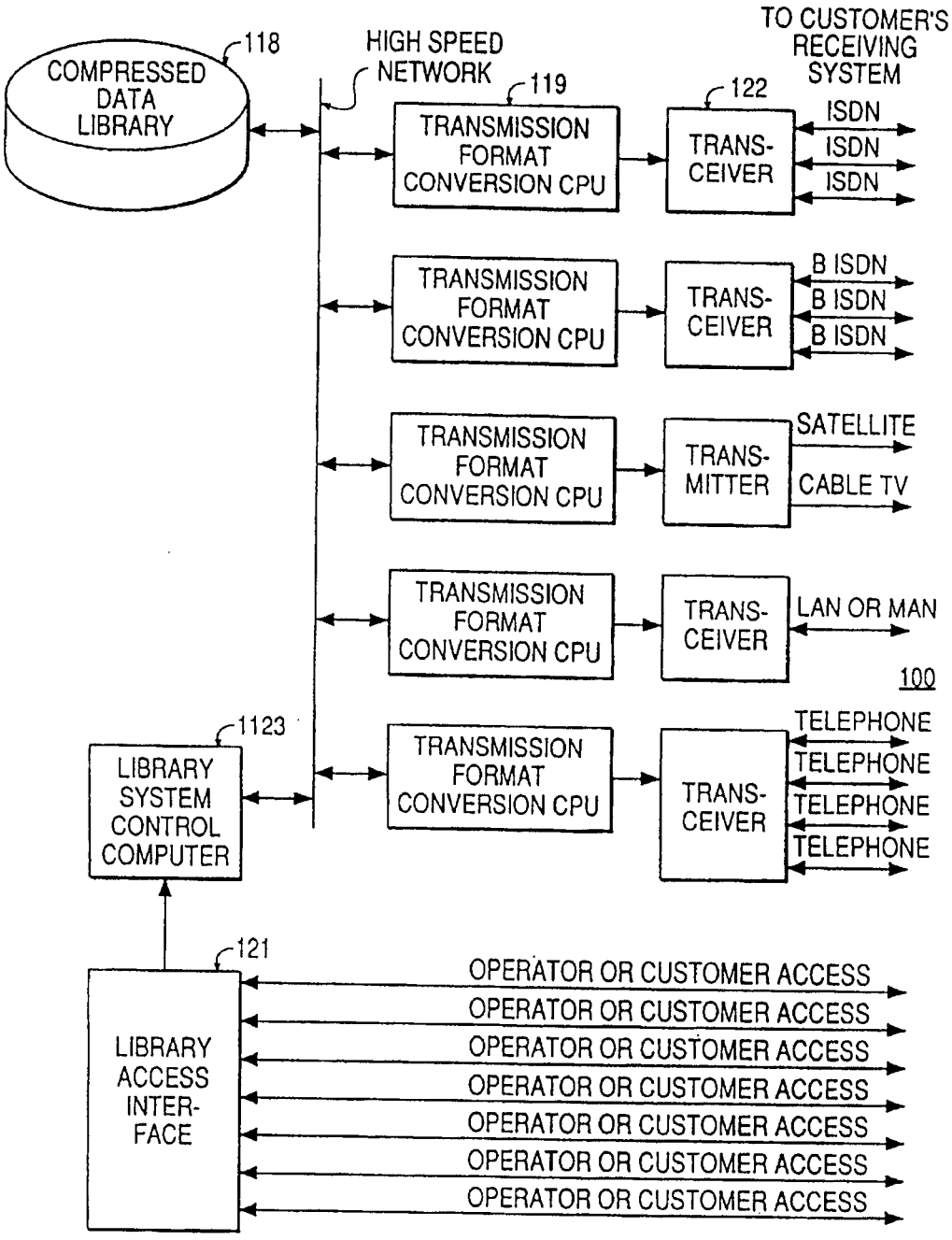

118
COMPRESSED DATA LIBRARY
HIGH SPEED NETWORK
119
TRANSMISSION FORMAT CONVERSION CPU
122
TRANS-CEIVER
TO CUSTOMER'S RECEIVING SYSTEM
ISDN
ISDN
ISDN
TRANSMISSION FORMAT CONVERSION CPU
TRANS-CEIVER
B ISDN
B ISDN
B ISDN
TRANSMISSION FORMAT CONVERSION CPU
TRANS-MITTER
SATELLITE
CABLE TV
TRANSMISSION FORMAT CONVERSION CPU
TRANS-CEIVER
LAN OR MAN
100
1123
LIBRARY SYSTEM CONTROL COMPUTER
TRANSMISSION FORMAT CONVERSION CPU
TRANS-CEIVER
TELEPHONE
TELEPHONE
TELEPHONE
TELEPHONE
121
LIBRARY ACCESS INTER-FACE
OPERATOR OR CUSTOMER ACCESS
OPERATOR OR CUSTOMER ACCESS
OPERATOR OR CUSTOMER ACCESS
OPERATOR OR CUSTOMER ACCESS
OPERATOR OR CUSTOMER ACCESS
OPERATOR OR CUSTOMER ACCESS
OPERATOR OR CUSTOMER ACCESS

FIG. 2b

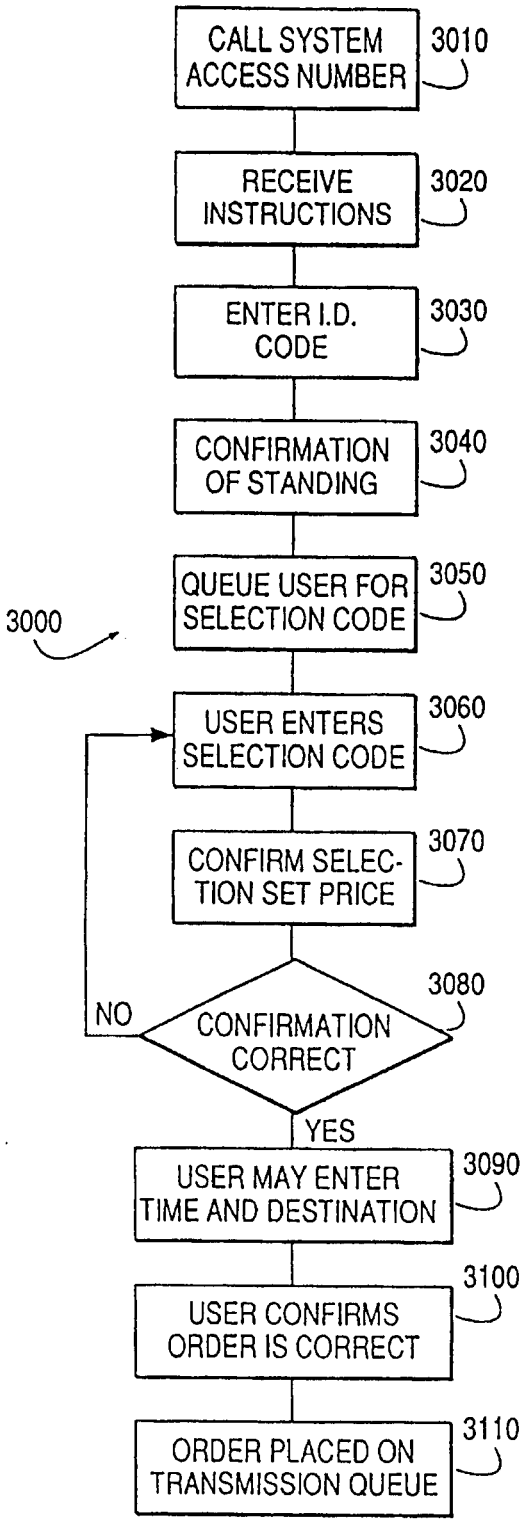

CALL SYSTEM ACCESS NUMBER
3010
RECEIVE INSTRUCTIONS
3020
ENTER I.D. CODE
3030
CONFIRMATION OF STANDING
3040
QUEUE USER FOR SELECTION CODE
3050
3000
USER ENTERS SELECTION CODE
3060
CONFIRM SELECTION SET PRICE
3070
CONFIRMATION CORRECT
3080
NO
YES
USER MAY ENTER TIME AND DESTINATION
3090
USER CONFIRMS ORDER IS CORRECT
3100
ORDER PLACED ON TRANSMISSION QUEUE
3110

FIG. 3

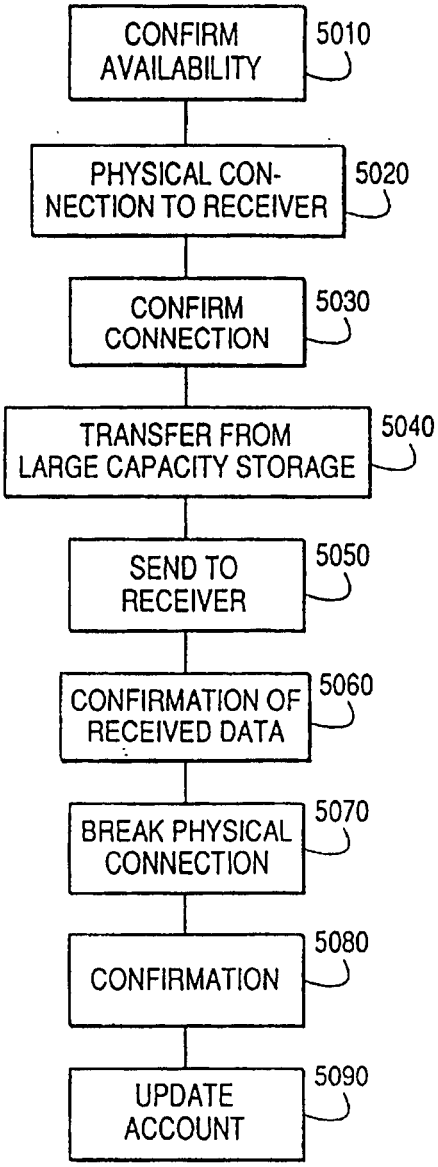

CONFIRM AVAILABILITY
5010
PHYSICAL CONNECTION TO RECEIVER
5020
CONFIRM CONNECTION
5030
TRANSFER FROM LARGE CAPACITY STORAGE
5040
SEND TO RECEIVER
5050
CONFIRMATION OF RECEIVED DATA
5060
BREAK PHYSICAL CONNECTION
5070
CONFIRMATION
5080
UPDATE ACCOUNT
5090

FIG. 5

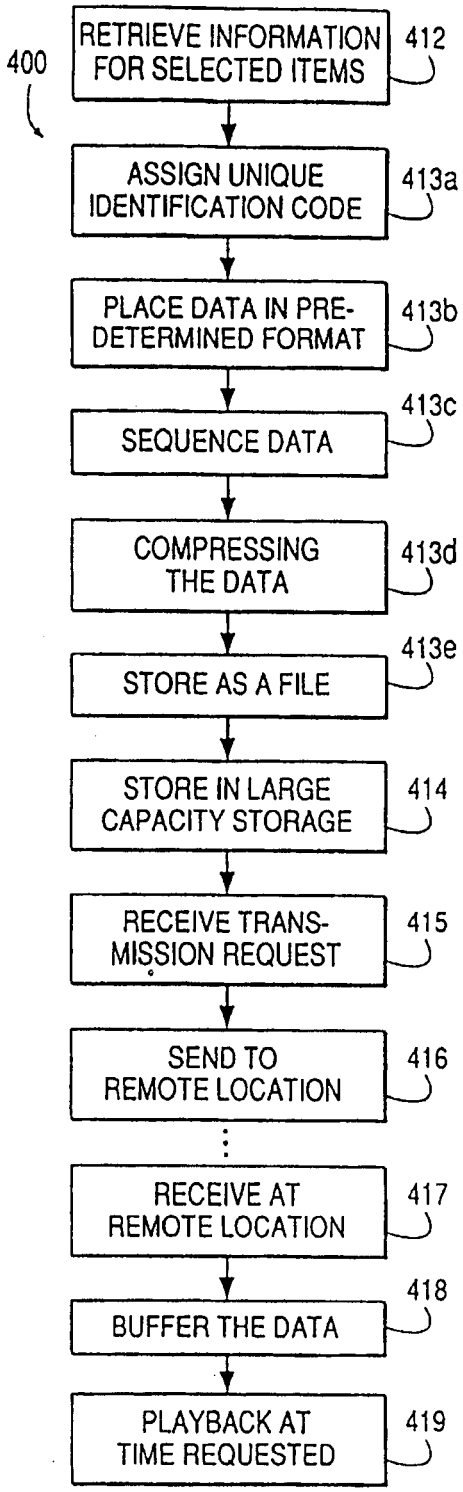

400
RETRIEVE INFORMATION FOR SELECTED ITEMS
412
ASSIGN UNIQUE IDENTIFICATION CODE
413a
PLACE DATA IN PREDETERMINED FORMAT
413b
SEQUENCE DATA
413c
COMPRESSING THE DATA
413d
STORE AS A FILE
413e
STORE IN LARGE CAPACITY STORAGE
414
RECEIVE TRANSMISSION REQUEST
415
SEND TO REMOTE LOCATION
416
RECEIVE AT REMOTE LOCATION
417
BUFFER THE DATA
418
PLAYBACK AT TIME REQUESTED
419

FIG. 7

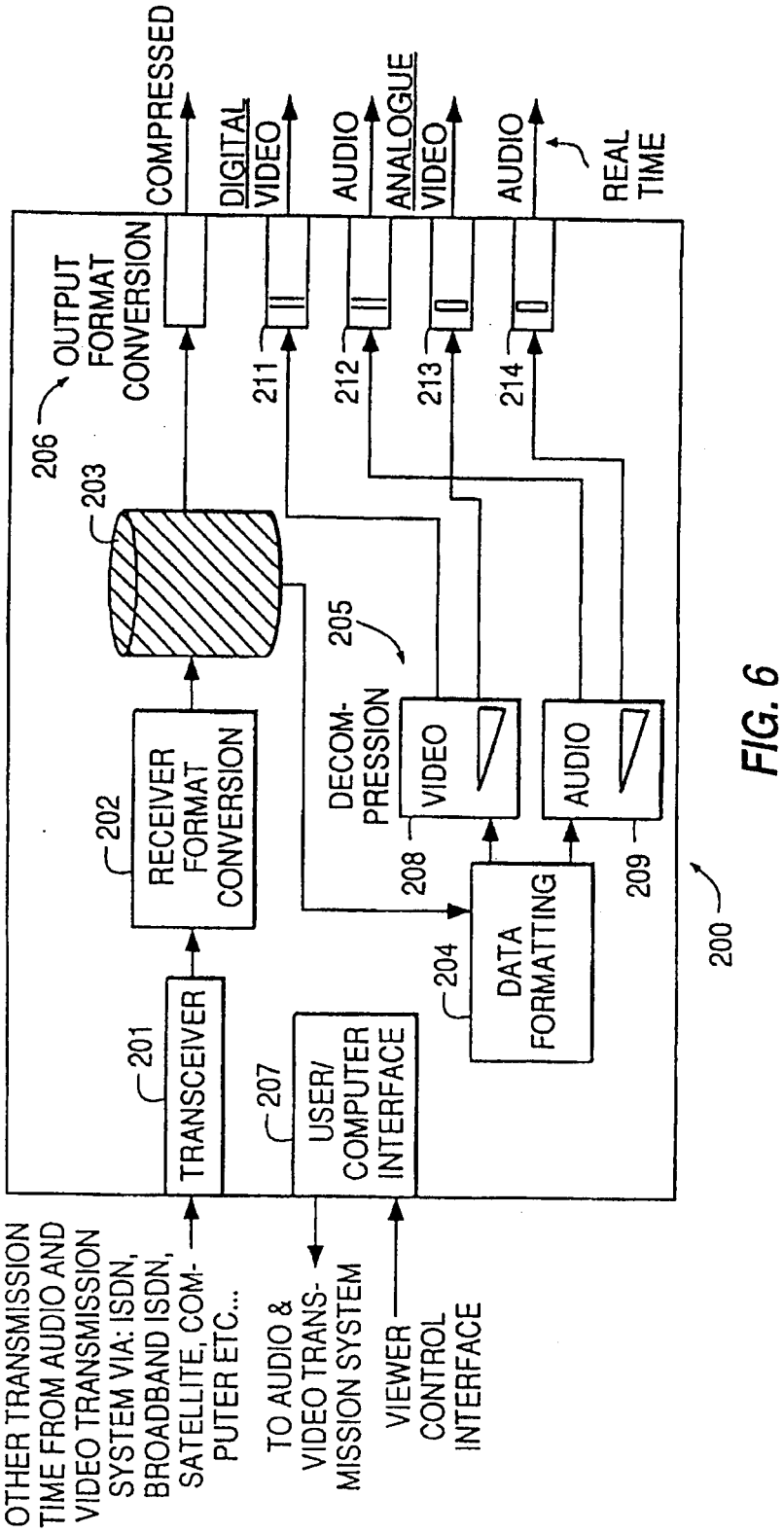

COMPRESSED
DIGITAL VIDEO
AUDIO
ANALOGUE VIDEO
AUDIO
REAL TIME
OUTPUT FORMAT CONVERSION
206
203
211
212
213
214
205
DECOM-PRESSION
VIDEO
AUDIO
RECEIVER FORMAT CONVERSION
202
208
209
200
204
DATA FORMATTING
201
TRANSCEIVER
207
USER/ COMPUTER INTERFACE
OTHER TRANSMISSION TIME FROM AUDIO AND VIDEO TRANSMISSION SYSTEM VIA: ISDN, BROADBAND ISDN, SATELLITE, COM-PUTER ETC...
TO AUDIO & VIDEO TRANS-MISSION SYSTEM
VIEWER CONTROL INTERFACE

FIG. 6

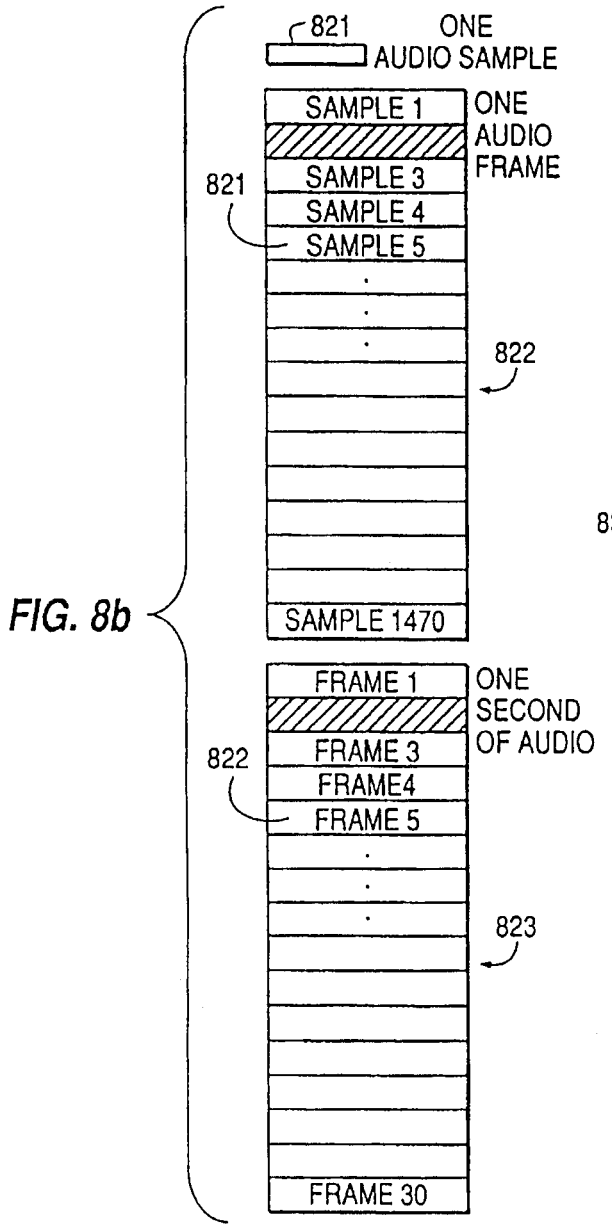

821
ONE AUDIO SAMPLE
SAMPLE 1
ONE AUDIO FRAME
SAMPLE 3
SAMPLE 4
SAMPLE 5
821
822
SAMPLE 1470
FRAME 1
ONE SECOND OF AUDIO
FRAME 3
FRAME4
FRAME 5
822
823
FRAME 30

FIG. 8b

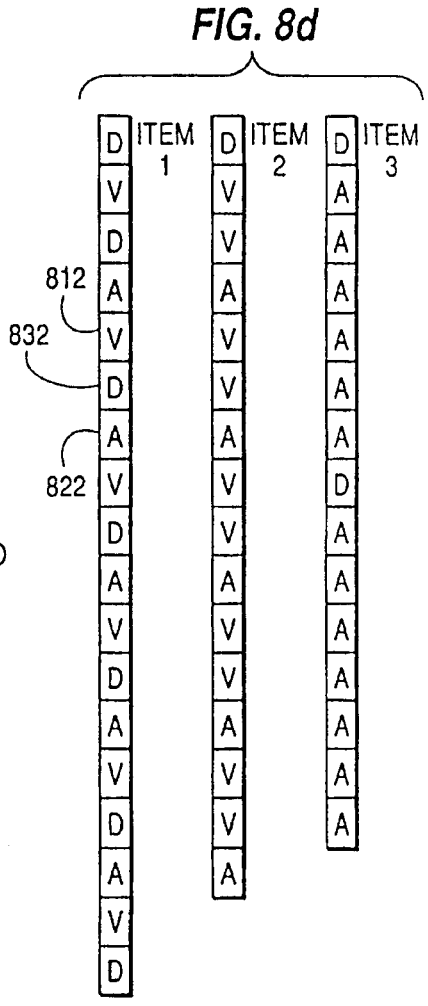

ITEM 1
ITEM 2
ITEM 3
812
832
822

FIG. 8d

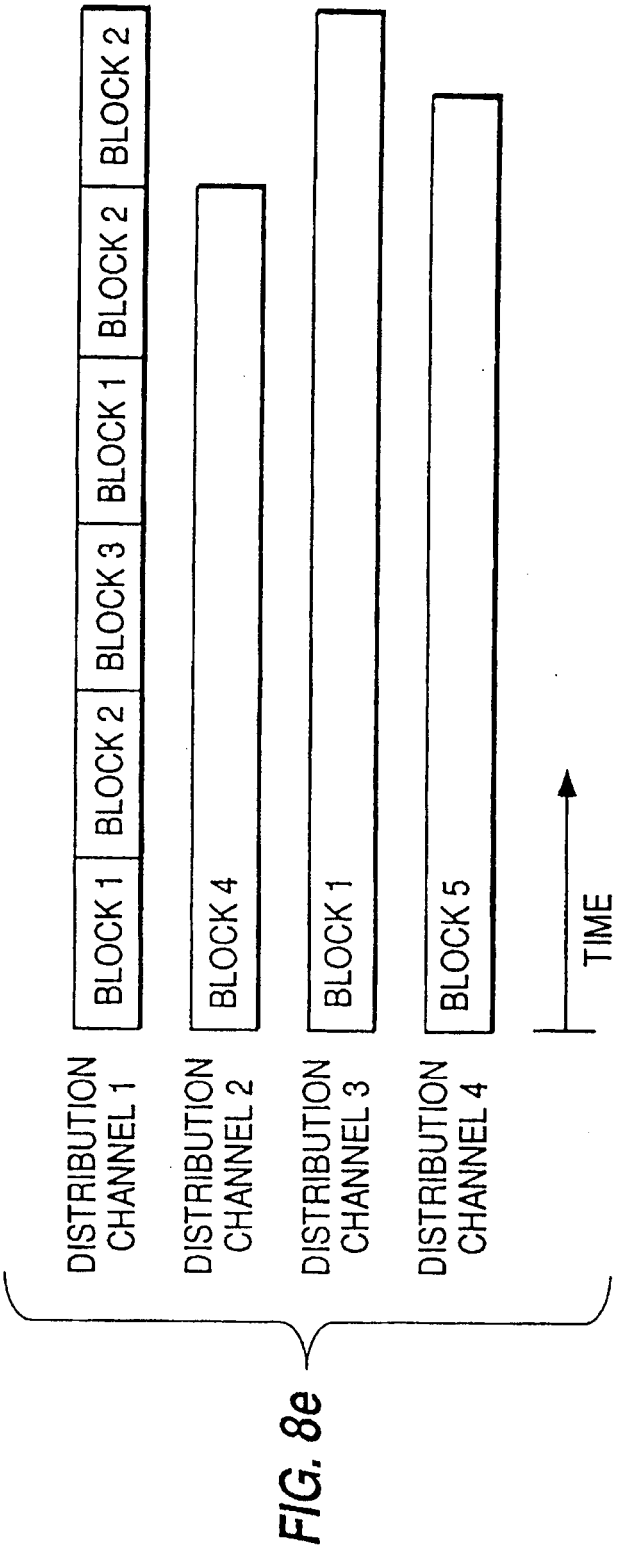

BLOCK 1
BLOCK 2
BLOCK 3
BLOCK 1
BLOCK 2
BLOCK 2
BLOCK 4
BLOCK 1
BLOCK 5
TIME
DISTRIBUTION CHANNEL 1
DISTRIBUTION CHANNEL 2
DISTRIBUTION CHANNEL 3
DISTRIBUTION CHANNEL 4

FIG. 8e

AUDIO AND VIDEO TRANSMISSION AND RECEIVING SYSTEM

This is a continuation of prior application Ser. No. 07/862,508 filed Apr. 2, 1992 which issues as U.S. Pat. No. 5,253,275 on Oct. 12, 1993, which is a continuation of prior application Ser. No. 07/637,562 filed Jan. 7, 1991 which issued as U.S. Pat. No. 5,132,992 on Jul. 21, 1992.

BACKGROUND OF THE INVENTION

The present invention relates generally to an audio and video transmission and receiving system, and more specifically to such a system in which the user controls the access and the playback operations of selected material.

At the present time, only a video cassette recorder (VCR) or a laser disk player (LDP) allow a viewer to enjoy control over selection of particular audio/video material. Using either a VCR or an LDP requires the viewer to obtain a video tape either by rental or by purchase. Remote accessing of the material has not yet been integrated into an efficient system.

Several designs have been developed which provide the viewer with more convenient means of accessing material. One such design is disclosed in U.S. Pat. No. 4,506,387, issued to Walter. The Walter patent discloses a fully dedicated, multi-conductor, optical cable system that is wired to the viewer's premises. While the system affords the viewer some control over accessing the material, it requires that a location designated by the viewer be wired with a dedicated cable. The Walter system further requires the viewer be at that location for both ordering and viewing the audio/video material.

U.S. Pat. No. 4,890,320, issued to Monslow, describes a system which broadcasts viewer selected material to a viewer at a prescribed time. This system is limited in that it requires multiple viewers in multiple locations to view the audio/video material at the time it is broadcast, rather than allowing each viewer to choose his or her own viewing time. The system disclosed in Monslow also does not allow for the stop, pause, and multiple viewing functions of existing VCR technology.

U.S. Pat. No. 4,590,516, issued to Abraham, discloses a system that uses a dedicated signal path, rather than multiple common carriers, to transmit audio/video programming. The receiver has no storage capability. The system provides for only display functions, which limits viewing to the time at which the material is ordered. Like Monslow, the Abraham system does not allow for the stop, pause, and multiple viewing functions of existing VCR technology.

U.S. Pat. No. 4,963,995, issued to Lang, discloses an audio/video transceiver with the capability of editing and/or copying from one video tape to another using only a single tape deck. Lang does not disclose a system with one or more libraries wherein a plurality of system subscribers may access information stored in the film and tape library or libraries, and play back the selected information at a time and place selected by the subscriber.

It is therefore an object of the present invention to provide a user with the capability of accessing audio/video material by integrating both accessing and playback controls into a system that can use multiple existing communications channels.

It is a further object of the present invention to provide a picture and sound transmission system which allows the user to remotely select audio/video material from any location that has either telephone service or a computer.

A still further object of the present invention is to provide a picture and sound transmission system wherein the selected audio/video material is sent over any one of several existing communication channels in a fraction of real time to any location chosen by the user that has a specified receiver.

Another object of the present invention is to provide a picture and sound transmission system wherein the user may play back the selected audio/video material at any time selected by the user and retain a copy of the audio/video material for multiple playbacks in the future.

Another object of the present invention is to provide a picture and sound transmission system wherein the information requested by the user may be sent as only audio information, only video information, or as a combination of audio and video information.

Additional objects and advantages of the invention will be set forth in the description which follows, and in part will be obvious from the description, or may be learned by practice of the invention. The objects and advantages of the invention may be realized and obtained by means of the instrumentalities and combinations particularly pointed out in the appended claims.

SUMMARY OF THE INVENTION

To achieve the objects in accordance with the purposes of the present invention, as embodied and described herein, the transmission and receiving system for providing information to remote locations comprises source material library means prior to identification and compression; identification encoding means for retrieving the information for the items from the source material library means and for assigning a unique identification code to the retrieved information; conversion means, coupled to identification encoding means, for placing the retrieved information into a predetermined format as formatted data; ordering means, coupled to the conversion means, for placing the formatted data into a sequence of addressable data blocks; compression means, coupled to the ordering means, for compressing the formatted and sequenced data; compressed data storing means, coupled to the compression means, for storing as a file the compressed sequenced data received from the compression means with the unique identification code assigned by the identification encoding means; and transmitter means, coupled to the compressed data storing means, for sending at least a portion of a specific file to a specific one of the remote locations.

The present invention further comprises a distribution method responsive to requests identifying information to be sent from a transmission system to a remote location, the method comprising the steps of storing audio and video information in a compressed data form; requesting transmission, by a user, of at least a part of the stored compressed information to the remote location; sending at least a portion of the stored compressed information to the remote location; receiving the sent information at the remote location; buffering the processed information at the remote location; and playing back the buffered information in real time at a time requested by the user.

Additionally, the present invention comprises a receiving system responsive to a user input identifying a choice of an item stored in a source material library to be played back to the subscriber at a location remote from the source material library, the item containing information to be sent from a transmitter to the receiving system, and wherein the receiving system comprises transceiver means for automatically receiving the requested information from the transmitter as

compressed formatted data blocks; receiver format conversion means, coupled to the transceiver means, for converting the compressed formatted data blocks into a format suitable for storage and processing resulting in playback in real time; storage means, coupled to the receiver format conversion means, for holding the compressed formatted data; decompressing means, coupled to the receiver format conversion means, for decompressing the compressed formatted information; and output data conversion means, coupled to the decompressing means, for playing back the decompressed information in real time at a time specified by the user.

BRIEF DESCRIPTION OF THE DRAWINGS

The accompanying drawings, which are incorporated in and constitute a part of the specification, illustrate the presently preferred apparatus and method of the invention and, together with the general description given above and the detailed description of the preferred embodiment given below serve to explain the principled of the invention. In the drawings:

FIGS. **1***a*–**1***g* are high level block diagrams showing different configurations of the transmission and receiving system of the present invention;

FIGS. **2***a* and **2***b* are detailed block diagrams of preferred implementations of the transmission system of the present invention;

FIG. **3** is a flowchart of a preferred method of ordering a selection from a library in accordance with the present invention;

FIG. **4** is a flowchart of a preferred method of user request via a user interface of the present invention;

FIG. **5** is a flowchart of a preferred method of implementing a queue manager program of the present invention;

FIG. **6** is a block diagram of a preferred implementation of the receiving system of the present invention;

FIG. **7** is a flowchart of a preferred method of distribution of the present invention; and

FIGS. **8***a*–**8***e* are block diagrams of preferred implementations of data structures and data blocking for items in the audio and video distribution system of the present invention.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

FIGS. **1***a*–**1***g* are high level block diagrams showing different configurations of the transmission and receiving system of the present invention. FIGS. **1***a*, **1***b*, **1***d*, **1***e*, **1***f*, and **1***g* each show transmission system **100**, described in more detail below with respect to FIGS. **2***a* and **2***b*. A user of the transmission and receiving system of the present invention preferably accesses transmission system **100** by calling a phone number or by typing commands into a computer. The user then chooses audio and/or video material from a list of available items which he or she wants to listen to and/or watch.

As shown in FIG. **1***a*, the transmission and receiving system may preferably comprise a peer to peer configuration where one transmission system **100** communicates with one reception system **200**. As shown in FIG. **1***b*, the transmission and receiving system of the present invention may alternatively comprise a plurality of reception systems **200**, **200'**, **200"**, and **200'"**, which are each associated with a single transmission system **100**.

FIG. **1***c* shows a high level block diagram of the transmission and receiving system of the present invention including remote order processing and item database **300**, described in more detail with respect to FIG. **3**. Remote order processing and item database **300** preferably enables users to access desired items by remote communication. The remote order processing and item database **300** may communicate with a plurality of transmission systems **100**, **100'**, **100"**, and **100'"**, each of which communicates with a respective set of reception systems **200**, **200'**, **200"**, and **200'"**. Each of the reception systems in sets **200**, **200'**, **200"**, and **200'"** may preferably communicate with a plurality of users.

FIG. **1***d* shows a high level block diagram of the transmission and receiving system of the present invention including a transmission system **100** distributing to a plurality of users via a reception system **200** configured as a cable television system.

FIG. **1***e* shows a high level block diagram of the transmission and receiving system of the present invention including a transmission system **100** distributing to a plurality reception systems **200** and **200'**. In the configuration shown in FIG. **1***e*, reception system **200** is a direct connection system wherein a user is directly connected to transmission system **100**. Reception system **200'** preferably includes a first cable television system **200***a* and a second cable television system **200***b*. Users of cable television systems **200***a* and **200***b* are indirectly connected to transmission system **100**

FIG. **1***f* shows a high level block diagram of the transmission and receiving system of the present invention including transmission system **100** distributing via several channels to reception systems **200** and **200'**. Reception system **200** is preferably non-buffering. In such a system, users are directly connected to transmission system **100**, as in reception system **200** in FIG. **1***e*.

Reception system **200'** shown in FIG. **1***f* is a cable television system, as shown in reception system **200'** of FIG. **1***e*. In FIG. **1***f*, the reception system **200'** is preferably buffering, which means that users may receive requested material at a delayed time. The material is buffered in intermediate storage device **200***c* in reception system **200'**.

In the configuration of FIG. **1***f*, decompression of the requested material may preferably occur at the head end of a cable television reception system **200'**. Thus, distribution may be provided to users via standard television encoding methods downstream of the head end of the cable distribution system. This method is preferred for users who only have cable television decoders and standard television receivers.

FIG. **1***g* shows a high level block diagram of the transmission and receiving system of the present invention including transmission system **100** distributing to a reception system **200**, which then preferably transmits requested material over airwave communication channels **200***d*, to a plurality of users. The transmission and receiving system shown in FIG. **1***g* may preferably transmit either compressed or uncompressed data, depending on the requirements and existing equipment of the user. The airwave transmission and receiving system shown in FIG. **1***g* may preferably employ either VHF, UHF or satellite broadcasting systems.

With respect to the transmission and receiving systems set forth in FIGS. **1***a*–**1***g*, the requested material may be fully compressed and encoded, partly decompressed at some stage in transmission system **100**, or fully decompressed prior to transmission. The reception systems **200** may either buffer the requested material for later viewing, or decom-

press in real time the requested material as it is distributed by transmission system **100**. Alternatively, the reception systems **200** of the present invention may perform a combination of buffering and non-buffering by buffering some of the requested material and decompressing the remainder of the requested material for immediate viewing as it is distributed by transmission system **100**.

In direct connection configurations, such as reception systems **200** shown in FIGS. **1***e* and **1***f*, the user preferably selects the reception system **200** to which the requested material is sent, and optionally selects the time playback of the requested material as desired. Accordingly, the user may remotely access the transmission system **100** from a location different than the location of reception system **200** where the material will be sent and/or played back. Thus, for example, a user may preferably call transmission system **100** from work and have a movie sent to their house to be played back after dinner or at any later time of their choosing.

In non-direct connection reception systems such as shown in reception system **200'** of FIG. **1***f*, intermediate storage device **200***c* may preferably include, for example, sixteen hours of random access internal audio and video storage. A reception system with such storage is capable of storing several requested items for future playback. The user could then view and/or record a copy of the decompressed requested material in real time, or compressed in non-real time, at a time of their choosing. Accordingly, the user would not have to make a trip to the store to purchase or rent the requested material.

In any of the transmission and receiving systems illustrated in FIGS. **1***a*–**1***g*, the requested material may be copy protected. To achieve copy protection, the requested material, as an item, is encoded as copy protected during storage encoding in transmission system **100**. The user may then play back the item only one time. The user may also optionally review select portions of the item prior to its automatic erasure from the memory of the reception system **200**. In this way, requested material may be distributed to "view only" users and also to "view and copy" users who wish to retain copies of the distributed items.

Copy protected programs, when decompressed and played back, would have a copy protection technique applied to the analog and digital output signals. The analog video output is protected from copying through the use of irregular sync signals, which makes the signal viewable on a standard television but not recordable on a audio/video recorder. The receiving systems recognizes copy protected programs and disables the audio/video recorder. Digital output protection is effected through copy protect bit settings in the digital output signal, thus preventing a compatible digital recorder from recording the digital audio and/or video signal stream. A protected item will not be passed to the compressed data port of the digital recorder for off line storage.

FIGS. **2***a* and **2***b* illustrate detailed block diagrams of preferred implementations of the transmission system **100** of the present invention. Transmission system **100** may either be located in one facility or may be spread over a plurality of facilities. A preferred embodiment of transmission system **100** may preferably include only some of the elements shown in FIGS. **2***a* and **2***b*.

Transmission system **100** of a preferred embodiment of the present invention preferably includes source material library means for temporary storage of items prior to conversion and storage in a compressed data library means. The items of information may include analog and digital audio and video information as well as physical objects such as books and records which require conversion to a compatible media type before converting, compressing and storing their audio and video data in the compressed data library means.

As shown in FIG. **2***a*, the source material library means included in transmission system **100** preferably includes a source material library **111**. The source material library **111** may include different types of materials including television programs, movies, audio recordings, still pictures, files, books, computer tapes, computer disks, documents of various sorts, musical instruments, and other physical objects. These materials are converted to or recorded on a media format compatible to the digital and analog inputs of the system prior to being compressed and stored in a compressed data library **118**. The different media formats preferably include digital or analog audio and video tapes, laser disks, film images, optical disks, magnetic disks, computer tapes, disks and, cartridges.

The source material library **111**, according to a preferred embodiment of the present invention, may preferably include a single source material library or a plurality of source material libraries. If there are a plurality of source material libraries, they may be geographically located close together or may be located far apart. The plurality of source material libraries may communicate using methods and channels similar to the methods and channel types which libraries may employ for communication with the receiving system **200** of the user, or the source material libraries may communicate via any available method.

Prior to being made accessible to a user of the transmission and receiving system of the present invention, the item must be stored in at least one compressed data library **118**, and given a unique identification code by identification encoder **112**. Storage encoding, performed by identification encoder **112**, aside form giving the item a unique identification code, optionally involves logging details about the item, called program notes, and assigning the item a popularity code. Storage encoding may be performed Just prior to conversion of the item for transmission to reception system **200**, at any time after starting the conversion process, or after storing the item in the compressed data library **118**.

In a preferred embodiment of the present invention, the method of encoding the information involves assigning a unique identification code and a file address to the item, assigning a popularity code, and inputting the program notes. This process is identical for any of the different media types stored in the source material library **111**.

The transmission system **100** of the present invention also preferably includes conversion means **113** for placing the items from source material library **111** into a predetermined format as formatted data. In the preferred embodiment, after identification encoding is performed by identification encoder **112**, the retrieved information is placed into a predetermined format as formatted data by the converter **113**. The items stored in source material library **111** and encoded by identification encoder **112** may be in either analog or digital form. Converter **113** therefore includes analog input receiver **127** and digital input receiver **124**. If items have only one format, only one type of input receiver **124** or **127** is necessary.

When the information from identification encoder **112** is digital, the digital signal is input to the digital input receiver **124** where it is converted to a proper voltage. A formatter **125** sets the correct bit rates and encodes into least significant bit (lsb) first pulse code modulated (pcm) data. Formatter **125** includes digital audio formatter **125***a* and digital

video formatter **125***b*. The digital audio information is input into a digital audio formatter **125***a* and the digital video information, if any, is input into digital video formatter **125***b*. Formatter **125** outputs the data in a predetermined format.

When the retrieved information from identification encoder **112** is analog, the information is input to an analog-to-digital converter **123** to convert the analog data of the retrieved information into a series of digital data bytes. Converter **123** preferably forms the digital data bytes into the same format as the output of formatter **125**.

Converter **123** preferably includes an analog audio converter **123***a* and an analog video converter **123***b*. The analog audio converter **123***a* preferably converts the retrieved audio signal into pcm data samples at a fixed sampling rate. The analog video converter **123***b* preferably converts the analog video information, retrieved from identification encoder **123**, into pcm data also at fixed sampling rates.

If the retrieved information being converted contains only audio information, then the audio signal is fed to the appropriate digital audio input or analog audio input. When the retrieved information contains both audio and video information, the audio and video signals are passed simultaneously to the audio and video converter inputs. Synchronization between the audio and video data can be maintained in this way.

If, for example, the retrieved information to be converted from the source material library **111** is a motion picture film, the picture frames in the film are passed through a digital telecine device to the digital input receiver **124**. Format conversion is then preferably performed by digital video formatter **125***b*. Accompanying audio information is passed through an optical or magnetic digital playback device. This device is connected to digital audio formatter **125***a*.

In some cases, such as in inter-library transfers, incoming materials may be in a previously compressed form so that there is no need to perform compression by precompression processor **115** and compressors **128** and **129**. In such a case, retrieved items are passed directly from identification encoder **112** to the compressed data formatter **117**. The item database records, such as the program notes which may also be input from another system, to the compressed data formatting section **117**, where this data, if necessary, is reformatted to make it compatible with the material stored in compressed data library **118**. Such material may be received in the form of digital tapes or via existing communication channels and may preferably input directly to a short term storage **117'** in the compressed data formatting section **117**.

The transmission system **100** of the present invention also preferably includes ordering means for placing the formatted information into a sequence of addressable data blocks. As shown in FIG. **2***a*, the ordering means in the preferred embodiment includes time encoder **114**. After the retrieved information is converted and formatted by the converter **113**, the information may be time encoded by the time encoder **114**. Time encoder **114** places the blocks of converted formatted information from converter **113** into a group of addressable blocks. The preferred addressing scheme employs time encoding. Time encoding allows realignment of the audio and video information in the compressed data formatting section **117** after separate audio and video compression processing by precompression processor **115** and compressor **116**.

The converted formatted information of the requested material is then preferably in the form of a series of digital data bytes which represent frames of video data and samples of the audio data A preferred relationship of the audio and video bytes to each other is shown in FIG. **8**. Incoming signals are input and converted in sequence, starting with the first and ending with the last frame of the video data, and starting with the first and ending with the last sample of the audio data. Time encoding by time encoder **114** is achieved by assigning relative time markers to the audio and video data as it passes from the converter **113** through the time encoder **114** to the precompression processor **115**. Realignment of audio and video data, system addressing of particular data bytes, and user addressing of particular portions of items are all made possible through time encoding.

Through the use of the address of an item and its frame number it is possible to address any particular block of audio or video data desired. From here, further addressing down to the individual byte is possible. Frames and groups of frames may preferably be further broken down, as necessary to the individual bytes and bits, as required for certain processing within the system.

User and system addressing requirements dictate the level of granularity available to any particular section of the system. Users are able to move through data in various modes, thus moving through frame addresses at various rates. For example, a user may desire to listen to a particular song. They may preferably enter the song number either when requesting the item from the compressed data library **118** and only have that song sent to their receiving system **200** or they may preferably select that particular song from the items buffered in their receiving system **200**. Internal to the system, the song is associated with a starting frame number, which was indexed by the system operator via the storage encoding process. The system item database may contain information records for individual frames or groups of frames. These can represent still frames, chapters, songs, book pages, etc. The frames are a subset of, and are contained within, the items stored in the compressed data library **118**. Time encoding by time encoder **114** makes items and subsets of items retrievable and addressable throughout the transmission system **100**. Time encoding enables subsequent compression of the information to be improved because data reduction processes may be performed in the time dimension. This is described in greater detail below.

The transmission system **100** of the present invention also preferably includes data compression means for compressing the formatted and sequenced data. The sequence of addressable data blocks which was time encoded and output by time encoder **114** is preferably sent to precompression processor **115**. The data arriving from time encoder **114** may be at various frame rates and of various formats. Precompression processor **115** preferably includes audio precompressor **115***a* and video precompressor **115***b*.

Video precompression processor **115***b* buffers incoming video data and converts the aspect ratio and frame rate of the data, as required by compression processor **116**. The frame buffer **131** of video precompression processor **115***b* holds all incoming data until the data is compressed by the data compressor **116**. The incoming video data is processed for sample rate optimization, aspect ratio fitting and buffered in buffer **130** for compression processing by the video precompression processor **115***b*.

Video precompression processor **115***b* processes the incoming video data so that it fits into the aspect ratio of the transmission and receiving system of the present invention. When incoming material with a different aspect ratio than the aspect ratio of the system is selected, a chosen background is preferably placed around the inactive region of the

video information. In this way, no data is lost to differences in the aspect ratio between incoming material, and the converted and compressed data stored in the transmission system **100**. Images resulting from a different aspect ratio may have an inactive region where background information is contained, or may be converted into a best fit arrangement. Output from the video precompression processor **115***b* is stored in the frame buffer **131**, which is dual ported and is directly addressable by video compressor **129**.

The incoming audio data is processed for sample rate and word length optimization and is then buffered in buffer **130** for compression processing by the audio precompression processor **115***a*. Audio precompression processor **115***a* may preferably transcode incoming audio information, as required, to create the optimum sample rate and word lengths for compression processing. The output of the audio precompression processor **115***a* is a constant sample rate signal of a fixed word length which is buffered in frame buffer **130**. The frame buffer **130** is dual ported and is directly addressable by audio compressor **128**. Blocking the audio data into frames at audio precompression processor **115***a* makes it possible to work with the audio data as addressable packets of information.

Once precompression processing is finished, the frames are compressed by the data compressor **116**. Compressor **116** preferably comprises an audio data compressor **128** and a video data compressor **129**. The benefits of data compression performed by data compressor **116** are shortened transmission time, faster access time, greater storage capacity, and smaller storage space requirements. Compression processing performed by compressors **128** and **129** requires multiple samples of data to perform optimum compression. Audio and video information is preferably converted into blocks of data organized in groups for compression processing by audio compressor **128** and video compressor **129**, respectively. These blocks are organized as frames, and a number of frames are contained respectively in the buffers **130** and **131**. By analyzing a series of frames it is possible to optimize the compression process.

Audio data is preferably compressed by audio compressor **128** by application of an adaptive differential pulse code modulation (ADPCM) process to the audio data. This compression process, which may be implemented by the apt-x **100** digital audio compression system, is manufactured by Audio Processing Technology (APT). Audio compression ratios of **8X** or greater are achieved with the APT system.

Compression by compressor **116** may be performed on a group of **24** video frames may preferably be passed in sequence to the frame buffer **130** of the video precompression processor **115***b* where they are analyzed by video compressor **129** which performs data reduction processing on the video data. Video compression is preferably performed by video compressor **129**. Video compression is achieved by the use of processors running algorithms designed to provide the greatest amount of data compression possible. Video data compression preferably involves applying two processes: a discrete cosine transform, and motion compensation. This process is described in "A Chip Set Core of Image Compression", by Artieri and Colavin. Multiple frames of video data may preferably be analyzed for patterns in the horizontal (H), vertical (V), diagonal (zigzag) and time (Z) axis. By finding repetition in the video data, redundancy may be removed and the video data may be compressed with a minimal loss of information.

In accordance with a preferred embodiment of the present invention, the transmission system **100** may further comprise compressed data storing means, coupled to the compression means, for storing as a file the compressed sequenced data with the unique identification code received from the data compression means. After compression processing by compressor **116**, the compressed audio and video data is preferably formatted and placed into a single file by the compressed data storage means **117**. The file may contain the compressed audio and/or video data, time markers, and the program notes. The file is addressable through the unique identification code assigned to the data by the identification encoder **112**.

Further, according to the present invention, the transmission system preferably includes compressed data library means for separately storing composite formatted data blocks for each of the files. The compressed data storage means preferably includes compressed data library **118**, as shown in FIG. **2***b*. After the data is processed into a file by the compressed data storage means **117**, it is preferably stored in a compressed data library **118**. In a preferred embodiment, compressed data library **118** is a network of mass storage devices connected together via a high speed network. Access to any of the files stored in compressed data library **118** is available from multiple reception systems **200** connected to the transmission and receiving system.

Stored items are preferably accessed in compressed data library **118** through a unique address code. The unique address code is a file address for uniquely identifying the compressed data items stored in the compressed data library section of a library system. This file address, combined with the frame number, and the library system address allow for complete addressability of all items stored in one or more compressed data libraries **118**. Compressed data library addresses along with receiving system addresses are used to form a completely unique address for distribution system control.

The unique address code is an address assigned to the item by the system operator during storage encoding, which is preferably done prior to long term storage in the compressed data library **118**. In a preferred embodiment, the unique address code is used for requesting and accessing information and items throughout the transmission and receiving system. The unique address code makes access to the requested data possible.

The storage encoding process performed by encoder **112** also allows entry of item notes and production credits. Production credits may include the title, names of the creators of the item such as the producer, director, actors, etc. Other details regarding the item which may be of interest and which may make the items more accessible are kept in an item database.

Item addresses are mapped to item names by identification encoder **112** and may preferably be used as an alternative method of accessing items. The item names are easier to remember, thus making user access more intuitive by using item names. The storage encoding entry process performed in identification encoder **112** operates a program which updates a master item database containing facts regarding items in the compressed data library system. The storage encoding process may be run by the system operator whereby the system operator accesses the master item database to track and describe items stored in one or more compressed data libraries. The names and other facts in the item database may preferably be updated at any time via the storage encoding process. Changes made to the master item database may be periodically sent to the remote order processing and item database. **300**.

As described in more detail later, a user may preferably access an item via its unique identification code, via its title, or the user may use other known facts for accessing an item. The user may access items in the compressed data library **118** directly using the unique address code or the user may obtain access via the remote order processing and item database **300**. Indirect access via the remote order processing and item database **300** is possible using, for example, a synthesized voice system, a query type of computer program interface, or customer assistance operators. In addition to providing interactive access to the remote order processing and item database **300**, a catalog listing some or all available titles may also preferably be published. With a published catalog, users may obtain the unique address code for an item very easily thereby allowing for retrieval from the compressed data library **118** without any help from an interactive system.

To achieve user access via an interactive system, facts about the items may be kept in files as a part of the items or the facts may be kept separately, for example, by systems which only inform users of the available items and take orders. For example, in systems which have portions split in separate locations, the facts about the items may be separated from the items themselves and stored in separate files. A system of this type can distribute user orders to other portions of the transmission and receiving system for ultimate distribution to the requesting user. Further, to support a plurality of users, multiple versions of the item database may preferably reside either on multiple database servers, in catalogs, or on other computer systems.

The item database master may reside in the system control computer **1123** where may be updated and kept current to the contents of the compressed data library **118**. The data stored in the item database master may be accessed by users via application programs, running on the system control computer **1123**, and on the reception system **200** of the user. Users may connect to the item database via any available telecommunication channels. Copies of the item database master may be updated and informed of new entries into compressed data library **118** at periodic intervals determined by the system manager.

Other copies of the item database master may also be made available to users from the remote order processing and item database **300** which batch processes and downloads user requests to the control computer **1123** of the compressed data library **118** via standard telecommunications or high speed communication channels. Moreover, multiple remote order processing and item database **300** sites make it possible for more locations to process orders than there are library facilities, and thus make order processing more efficient.

Preferably, access of a requested item via the remote order processing and item database **300** operates as follows. If the user does not know the title of the desired item, he or she may request the item by naming other unique facts related to the item. For example, a user would be able to access an item about Tibetan Medicine by asking for all items which include information about "Tibet" and include information about "Medicine." The remote order processing and item database **300** would then be searched for all records matching this request. If there is more than one item with a match, each of the names of the matching items are preferably indicated to the user. The user then selects the item or items that he or she desires. Upon selection and confirmation, by the user, a request for transmission of a particular item or items is sent to the distribution manager program of the system control computer **1123**. The request contains the address of the user, the address of the item, and optionally includes specific frame numbers, and a desired viewing time of the item.

The storage encoding process performed by identification encoder **112** also allows entry of a popularity code. The popularity code is preferably assigned on the basis of how often the corresponding item is expected to be requested from the compressed data library **118**. This popularity code can be used to determine the most appropriate form of media for storage of the compressed data in a mixed media system. Mixed media systems are preferably employed as more cost effective storage in very large compressed data libraries **118**. Once assigned, the popularity code may be dynamically updated, by factoring item usage against system usage. Thus, stored items are dynamically moved to the most appropriate media over their life in the compressed data library **118**. If a particular item stored in compressed data library **118** is retrieved frequently by users, storage in compressed data library **118** is preferably on higher speed, more reliable, and probably more expensive media. Such media includes Winchester and magneto-optical disks.

If an item stored in compressed data library **118** is retrieved less frequently, it may be stored in the compressed data library **118** on a digital cassette tape. Examples of such cassette tapes are a Honeywell RSS-600 (Honeywell Inc. Minneapolis Minn.), Summus JukeBoxFilm and tape library (Summus Computer Systems, Houston, Tex. 800-255-9638), or equivalent cassette tapes. All items stored in the compressed data library **118** are on line and are connected to the high speed network. Thus, they may be readily accessed.

Instead of using a remote order processing and item database **300**, the compressed data library **118** may include the program notes which were input by the system operator. The program notes may preferably include the title of the item stored in the compressed data library **118**, chapter or song titles, running times, credits, the producer of the item, acting and production credits, etc. The program notes of an item stored in the compressed data library **118** may be thus contained within the compressed data file formed in the compressed data formatter **117**.

In some cases, where multiple compressed data libraries **118** are organized, the popularity code may dictate distribution of a particular item to multiple distribution systems. In such cases, a copy of the compressed data is sent to another library and the other library can then distribute the compressed data to users concurrently with the original compressed data library **118**.

The compressed data library **118** is composed of a network of storage devices connected through a High Performance Parallel Interface (HPPI) Super Controller (available from Maximum Strategy Inc., San Jose, Calif.). Therefore, multiple communication controllers may preferably access the large quantity of data stored in compressed data library **118** at very high speeds for transfer to a reception system **200** of a user upon request. For more details on this configuration see Ohrenstein, "Supercomputers Seek High Throughput and Expandable Storage", Computer Technology Review, pp. 33–39 April 1990.

The use of an HPPI controller allows file placement onto multiple mass storage devices of the compressed data library **118** with a minimum of overhead. Database management software controls the location and tracking of the compressed data library **118** which can be located across multiple clusters of file servers connected together by one or more high speed networks over multiple systems.

The transmission system **100** of the present invention may also preferably include library access/interface means for

receiving transmission requests to transmit items and for retrieving formatted data blocks stored in the compressed data library **118** corresponding to the requests from users. The compressed audio and/or video data blocks, along with any of the information about the item stored in the compressed data library **118** may be accessed via library access interface **121**. The library access interface **121** receives transmission requests either directly from the users or indirectly by remote order processing and item database **300**. The transmission format means **119** receives the request and retrieves the composite formatted data block of the requested item stored in compressed data library **118** and converts the compressed formatted data block into a format suitable for transmission. The requested item is then sent to the user via the transmitter **122** or directly via interface **121**.

In a preferred embodiment of the present invention, customer access of an item stored in compressed data library **118** via the library access interface **121** may be performed in various ways. The methods of requesting a stored item are analogous to making an airline reservation or transferring funds between bank accounts. Just as there are different methods available for these processes it is desirable to have several ordering methods available to the users of the system of the present invention. For example, telephone tone decoders and voice response hardware may be employed. Additionally, operator assisted service or user terminal interfaces may be used.

Customer access via telephone tone decoders and voice response hardware is completely electronic and may preferably be performed between a system user and a computer order entry system. The user may obtain help in ordering an item from a computer synthesized voice. With such an access method, the user will normally be accessing a dynamic catalog to assist them. Confirmation of selections and pricing information may preferably be given to the user prior to completion of the transaction.

This process of access, performed by remote order processing and item database configuration **300**, shown in FIG. **1***c*, preferably includes the following steps, shown in flowchart: **3000** of FIG. **3**. First, the user calls the system access number (step **3010**). Upon successfully dialing the system access number, the user receives instructions from the system (step **3020**). The instructions may preferably include steps the user must take in order to place an order. Preferably, the instructions may be bypassed by the experienced user who knows how to place an order.

The user then enters a customer ID code by which the system accesses the user's account, and indicates to the system that the user is a subscriber of the system (step **3030**). In response to the user entering his ID code in step **3030** the system confirms whether the user is in good standing (step **3040**). If the user is in good standing, the system queues the user to input his request (step **3050**).

The user request may preferably be made from a catalog sent to each of the subscribers of the system. The user will preferably identify his choice and enter the corresponding identification code of the item (step **3060**). The system then preferably confirms the selection that the user has made and informs the user of the price of the selection (step **3070**).

The user then indicates whether the confirmation performed in step **3070** is correct (step **3080**). If the confirmation performed in step **3070** is correct, the user so indicates and then inputs a desired delivery time and delivery location (step **3090**).

If the confirmation performed in step **3070** does not result in the selection desired by the user, the user re-inputs the item identification code in step **3060** and the confirmation steps **3070** and **3080** are repeated. Therefore, proper selection of the selected item is insured. Once there is confirmation, the user enters the playback time and destination in step **3090**.

The user then preferably confirms that the order is correct (step **3100**). The confirmation performed in step **3100** includes confirmation of the entire transaction including the selected item, the selected time of playback, and the location of playback. The transaction is then completed and the request is placed on a transmission queue at the appropriate compressed data library **118** (step **3110**).

Access by the users via operator assisted service includes telephone operators who answer calls from the users. The operators can sign up new customers, take orders, and help with any billing problems. The operators will preferably have computer terminals which give them access to account information and available program information. Operators can also assist a user who does not know a title by looking up information stored in files which may contain the program notes, as described above. Once the chosen program is identified, the operator informs the user of the price. After the user confirms the order, the user indicates the desired delivery time and destination. The operator then enters the user request into the system. The request is placed in the transmission queue.

Access by a user terminal interface method provides the user with access from various terminals including personal computers, and specialized interfaces built into the reception system **200** for the user. Such access allows a user to do a search of available programs from a computer screen. This process involves the steps **4000** shown in FIG. **4**.

FIG. **4** is a flowchart of a preferred method of user request via a user interface of the present invention. In the preferred method of FIG. **4**, the user first logs onto the user terminal interface (step **4010**). After the user logs on, the user may preferably select a desired item by searching the database of available titles in the library system control computer **1123** or any remote order processing and item database **300** (step **4020**). The search may preferably be performed using the database containing the program notes, described above with respect to FIGS. **2***a* and **2***b*. It is possible to process orders and operate a database of available titles at multiple locations remote of the source material library **111**. Users and order processing operators may preferably access such remote systems and may place transmission requests from these systems. Orders placed on these systems will be processed and distributed to the appropriate libraries. After the desired item is found, the user selects the item for transmission at a specific time and location (step **4030**).

To complete an order, the remote order processing and item database **300** preferably connects to the compressed data library **118** of choice via the library access interface **121** and communicates with the library system control computer **1123**. Preferably the user's account ID, identification of the item for transmission and the chosen destination for the item are communicated. Through employment of distributed order processing systems of this type many orders may be processed with minimal library overhead.

All transmission requests from the access methods are placed into a transmission queue managed by the library system control computer **1123**. This queue is managed by a program that controls the distribution of the requested items to the reception system **200** of the user. The queue manager program also operates in the system control computer and keeps track of the user ID, the chosen program and price, the

user channel type, the number of requests for a given program, the latest delivery time, and the compressed data library media type (for example, high speed or low speed). From this information, the queue manager program makes best use of the available distribution channels and media for efficient transmission and storage of the requested items.

The queue manager program also manages the file transmission process for multiple requests for a single file, stored in the compressed data library **118**. During a given time period, the queue manager program will optimize access to the compressed data library **118**, wherever possible it will place the data on multiple outputs for simultaneous transmission to more than one requesting user.

The conversion performed by transmission data converter **119** encodes the data for the transmission channel. The transmission data converter transfers the desired segments of data from the compressed data library **118** onto the communication channel which is used to deliver the data to the reception system **200**.

The transmission system **100** of the present invention preferably further includes transmitter means **122**, coupled to the compressed data library **118**, for sending at least a portion of a specific file to at least one remote location. The transmission and receiving system of the present invention preferably operates with any available communication channels. Each channel type is accessed through the use of a communications adaptor board or processor connecting the data processed in the transmission format converter **119** to the transmission channel.

A preferred embodiment of the present invention also includes means by which to access users via common access lines. These may include standard telephone, ISDN or B-ISDN, microwave, DBS, cable television systems, MAN, high speed modems, or communication couplers. Metropolitan Area Networks (MANs) which are common carrier or private communication channels are designed to link sites in a region. MANs are described by Morreale and Campbell in "Metropolitan-area networks" (IEEE Spectrum, May 1990 pp. 40–42). The communication lines are used to transmit the compressed data at rates up to, typically, 10 Mb/sec.

In order to serve a multitude of channel types, a preferred embodiment of the present invention includes a multitude of output ports of each type connected to one or more computers on the transmission and receiving system. The management of transmission is then distributed. That is, the computer controlling the transmission queue tells the transmission encoding computer its task and then the task is executed by the transmission encoding computer, independent of the transmission queue computer. The transmission queue computer provides the data for transmission by the file server which also distributes to other transmitters located in the same or other transmission encoding computers.

FIG. **5** is a flowchart of a preferred method of implementing a queue manager program of the present invention. The queue manager program, in the distribution process, preferably confirms availability of an item from the compressed data library **118** and logically connects the item stored in compressed data library **118** to the communications controller, illustrated in FIG. **2***a* (step **5010**). After availability is confirmed in step **5010**, the data awaits transmission by the transmitter **122**.

After availability is confirmed in step **5010**, the communications controller preferably makes the physical connection to the reception system **200** of the user (step **5020**). This is normally done by dialing the receiving device of the user. The reception system **200** preferably answers the incoming call and confirms the connection (step **5030**).

Once connected to the reception system **200**, in steps **5020** and **5030**, the data stored in compressed data library **118** is preferably transferred in data blocks from the compressed data library **118** to the communications controller (step **5040**). The data blocks are buffered by the communications controller. The buffered data is sent down the communications channel to the reception system **200** by transmitter **122** (step **5050**).

The transmitter **122** places the formatted data onto the communications channel. This is an electrical conversion section and the output depends upon the chosen communication path. The signal is sent to the reception system **200** in either a two way or a one way communication process. In a standard telephone connection, the transmitter **122** is preferably a modem. When using an ISDN channel, the transmitter **122** is preferably a data coupler.

In a preferred embodiment of the present invention, many forms of communication channels may be employed. Distribution of information is by common carrier communication channels whenever possible. These channels include common telephone service, ISDN and Broadband ISDN, DBS, cable television systems, microwave, and MAN.

In order that reception is performed efficiently, the reception system **200** confirms reception of the initial data block before receiving the remaining data blocks whenever possible (step **5060**). After all data blocks have been received and reception is confirmed, the communications controller breaks the physical connection to the reception system **200** (step **5070**). Then, confirmation of the transmission is sent to the queue manager (step **5080**). Finally, the queue manager updates the list and sends the information to the billing program, which updates the account of the user (step **5090**).

When item distribution occurs through a broadcasting method such as a communications satellite, the process is one way, with ongoing reception not being confirmed by the reception system **200**. In these situations, some further redundancy is included by transmission formatter **122** with the data blocks for error correction processing to be performed in the reception system **200**. In such one way communication situations, the queue manager program running in library system control computer **1123** confirms reception, via telephone line connection for example, to the reception system **200** after distribution. This should occur prior to updating the user's account and the dispatch lists.

The real time output signals are output to a playback system such as an audio amplifier and/or television. This output may also be sent to an audio/video recorder for more permanent storage. Moreover, in the preferred embodiment only non-copy protected data can be recorded on an audio/video recorder. Any material which is copy protected will be scrambled at the video output in a way which makes it viewable on a standard audio/video receiver but does not allow for recording of the material.

The reception system **200** has playback controls similar to the controls available on a standard audio/video recorder. These include: play, fast forward, rewind, stop, pause, and play slow. Since items are preferably stored on random access media, the fast forward and rewinding functions are simulations of the actual events which occur on a standard audio/video recorder. Frames do not tear as on an audio/video recorder, but in fast play modes they go by very quickly.

The library access interface **121** in the reception system **200** preferably includes a title window where a list of available titles are alphabetically listed. This window has two modes: local listing of material contained within the

library system control computer **1123**, and library listing for all available titles which may be received from the available, remotely accessible libraries. The titles listed in this window are sent from the database on the library system control computer **1123** or the remote order processing and item database **300**.

The system may also preferably include dispatching control software which receives input from the remote order processing and item database **300** and sends distribution requests to the distribution systems. In instances where not all items are contained in each of the compressed data libraries **118**, the dispatching software will keep a list of the available titles in a particular compressed data library **118**. The dispatch software may also preferably coordinate network traffic, source material library **111** utilization, source material library **111** contents, and connection costs. By proper factoring of these variables, efficient use of the available distribution channels may be achieved.

FIG. **6** illustrates a block diagram of a preferred implementation of the reception system **200** according to the present invention. The reception system **200** is responsive to user requests for information stored in source material library **111**. The reception system **200** includes transceiver **201** which receives the audio and/or video information transmitted by transmitter **122** of the transmission system **100**. The transceiver **201** automatically receives the information from the transmitter **122** as compressed formatted data blocks.

The transceiver **201** is preferably connected to receiver format converter **202**. The receiver format converter **202** converts the compressed formatted data blocks into a format suitable for playback by the user in real time.

In the reception system **200** of the present invention, the user may want to play back the requested item from the source material library **111** at a time later than when initially requested. If that is the case, the compressed formatted data blocks from receiver format converter **202** are stored in storage **203**. Storage **203** allows for temporary storage of the requested item until playback is requested.

When playback is requested, the compressed formatted data blocks are sent to data formatter **204**. Data formatter **204** processes the compressed formatted data blocks and distinguishes audio information from video information.

The separated audio and video information are respectively decompressed by audio decompressor **209** and video decompressor **208**. The decompressed video data is then sent simultaneously to converter **206** including digital video output converter **211** and analog video output converter **213**. The decompressed audio data is sent simultaneously to digital audio output converter **212** and analog audio output converter **214**. The outputs from converters **211-214** are produced in real time.

The real time output signals are output to a playback system such as a TV or audio amplifier. They may also be sent to an audio/video recorder of the user. By using the reception system **200** of the present invention, the user may utilize the stop, pause, and multiple viewing functions of the receiving device. Moreover, in a preferred embodiment of the present invention, the output format converters may be connected to a recorder which enables the user to record the requested item for future multiple playbacks.

FIG. **7** is a flow chart **400** of a preferred method of distribution of the present invention. The distribution method is preferably responsive to requests identifying information to be sent from the transmission system **100** to remote locations. Method **400** assumes that the items have already been stored in compressed data library **118**.

As illustrated in FIG. **7**, the first step of the distribution method **400** involves retrieving the information for selected items in the source material library **111**, upon a request by a user of the distribution system (step **412**). This is analogous to taking books off of a shelf at the local public library after the person has decided that he or she would like to read them.

After the information for the selected items is retrieved in step **412**, the distribution method **400** of the present invention further comprises the step of processing the information for efficient transfer (step **413**). The processing performed in step **413** preferably includes assigning a unique identification code to the retrieved information performed by identification encoder **112**, shown and described with respect to FIG. **2***a* (step **413***a*). The processing also preferably includes placing the retrieved information into a predetermined format as formatted data by converter **113** (step **413***b*), and placing the formatted data into a sequence of addressable data blocks by ordering means **114** (step **413***c*).

Processing step **413** also includes compressing the formatted and sequenced data performed by data compressor **116** (step **413***d*), and storing as a file the compressed sequenced data received from the data compression means with the unique identification assigned by the identification encoding means (step **413***e*).

After the information is processed for efficient transfer, in substeps **413***a–e* of step **413**, the distribution method **400** of the present invention preferably includes the step of storing the processed information is stored in a compressed data library (step **414**). Preferably, the compressed data library is analogous to compressed data library **118**, described with respect to FIG. **2***a*.

After the information is stored in a compressed data library **118**, the transmission and receiving system preferably waits to receive a transmission request (step **415**). Upon receiving a transmission request, from transmission system **100**, the compressed formatted data is preferably converted for output to a reception system **200**, selected by the user. The information is preferably transmitted over an existing communication channel to a reception system **200**, and is received by that system (step **417**). When the information is received in step **417**, it is preferably formatted for the particular type of reception system **200** to which the information is sent.

The received information is preferably buffered (step **418**) by a storage means analogous to element **203** shown in FIG. **3**. The information is preferably buffered so that it may be stored by the user for possible future viewings. The requested information is then played back to the reception system **200** of the user at the time requested by the user (step **419**).

FIGS. **8***a–8e* are block diagrams of preferred implementations of data structures and data blocking for items in the audio and video distribution system. FIG. **8***a* shows the block structure of video data where a video frame **812** is composed of a plurality of video samples **811**, and a second of video **813** is composed of a plurality of video frames **812**.

FIG. **8***b* shows the block structure of audio data where an audio data frame **822** is composed of a plurality of audio samples **821**, and a second of audio **823** is composed of a plurality of audio data frames **822**. FIG. **8***c* shows the block structure of a data frame **832** composed of a plurality of data bytes **831**. The combination of the audio frames **812**, video frames **822**, and data frames **832** comprise the elements of a single item. FIG. **8***d* shows a block representation of for three illustrative items which may be stored in the source

material library **111**. Each of items **1-3** contains its own arrangement of video frames **812**, audio frames **822**, and data frames **832**.

FIG. **8***e* shows methods of distribution to reception systems **200** with both multiplexed and non-multiplexed signal paths, both addressed and non-addressed blocks of items. A block of an item may be an entire item or, alternatively, may be only a portion of an item, as selected by a user. Further, the blocks may be composed of either compressed, partially compressed, or fully decompressed data, as required by the configuration of the reception system **200**.

As shown in FIG. **8***e*, the same block, for example, block **1**, may be simultaneously transmitted over different distribution channels. The blocks when transmitted over one of the distribution channels may have receiver addresses appended to the blocks or the reception system **200** may have been preconfigured to receive the blocks comprising data frames for particular items from the active distribution channel.

Other embodiments of the invention will be apparent to those skilled in the art from consideration of the specification and practice of the invention disclosed herein. It is intended that the specification and examples be considered as exemplary only, with the true scope and spirit of the invention being indicated by the following claims.

What is claimed is:

1. A transmission system for providing information to be transmitted to remote locations, the transmission system comprising:

a plurality of library means for storing items containing information;

identification encoding means for retrieving the information in the items from the plurality of library means and for assigning a unique identification code to the retrieved information;

conversion means, coupled to the identification encoding means, for placing the retrieved information into a predetermined format as formatted data;

ordering means, coupled to the conversion means, for placing the formatted data into a sequence of addressable data blocks;

compression means, coupled to the ordering means, for compressing the formatted and sequenced data blocks;

compressed data storing means, coupled to the data compression means, for storing as files the compressed, sequenced data blocks received from the data compression means with the unique identification code assigned by the identification encoding means; and

transmitter means, coupled to the compressed data storing means, for sending at least a portion of one of the files to one of the remote locations.

2. A transmission system as recited in claim **1**, wherein the plurality of libraries are geographically separated.

3. A receiving system responsive to a user input identifying a choice of an item stored in a source material library at a transmission system, the item containing information to be sent from the transmission system to the receiving system, the receiving system comprising:

requesting means for transmitting to the source material library in the transmission system the identity of the item;

transceiver means, coupled to the requesting means, for receiving the item from the transmission system as at least one formatted data block;

receiver format conversion means, coupled to the transceiver means, for converting the at least one formatted data block into a format suitable for storage processing, and for playback at the receiver system; and

storage means, coupled to the receiver format conversion means, for storing a complete copy of the formatted data, the storage means including an off line recording media allowing for future multiple playbacks of the data.

4. A receiver system as recited in claim **3**, further comprising play back means, coupled to the receiver format conversion means, for playing back the copy of the data.

5. A receiver system as recited in claim **4**, further comprising:

recognizing means for recognizing protected data; and

disabling means, coupled to the recognizing means and the storage means, for disabling the second storage means when the recognizing means recognizes protected data.

6. A receiving system responsive to a user input identifying a choice of an item stored in a source material library at a transmission system, the item containing information to be sent from the transmission system to the receiving system, the receiving system comprising:

requesting means for transmitting to the source material library in the transmission system the identity of the item;

transceiver means, coupled to the requesting means, for receiving the item from the transmission system as at least one compressed, formatted data block;

receiver format conversion means, coupled to the transceiver means, for converting the at least one compressed, formatted data block into a format suitable for storage processing, and for playback at the receiver system;

first storage means, coupled to the receiver format conversion means, for storing a complete copy of the formatted data;

decompressing means, coupled to the first storage means, for decompressing the copy of the formatted data; and

second storage means, including an off line recording media allowing for future multiple playbacks, for storing a complete copy of the data.

7. A receiver system as recited in claim **6**, wherein the second storage means is coupled to the decompressing means, and the second storage means stores the decompressed copy of the data.

8. A receiver system as recited in claim **6**, further comprising play back means, coupled to the decompressing means, for playing back the decompressed copy of the data.

9. A receiver system as recited in claim **8**, further comprising:

recognizing means for recognizing protected data; and

disabling means, coupled to the recognizing means and the second storage means, for disabling the second storage means when the recognizing means recognizes protected data.

10. A system for providing information to be transmitted to remote locations, comprising:

identification encoding means for assigning a unique identification code to items of information;

conversion means, coupled to the identification encoding means, for placing each item of information into a predetermined format as formatted data;

ordering means, coupled to the conversion means, for placing the formatted data for each item of information into a sequence of addressable data blocks;

compression means, coupled to the ordering means, for compressing the formatted and sequenced data blocks;

compressed data storing means, coupled to the data compression means, for storing as files the compressed, sequenced data blocks; and

first transmitter means, coupled to the compressed data storing means, for selectively sending at least a portion of one of the files;

a distribution system, remote from the transmission system, the distribution system comprising:

means for receiving and storing a complete copy of the portion of one of the files sent by the first transmitter means; and

second transmitter means, responsive to the stored portion of the one of the files, for transmitting a representation of the stored portion to at least one of a plurality of the remote locations.

11. A transmission system as recited in claim **10**, wherein;

the first transmitter means transmits the portion of the one of the files at a non-real time rate; and the second transmitter means transmits the stored portion in substantially real time.

12. A transmission system as recited in claim **11**, wherein the second transmitter means comprises a decompressor for decompressing the complete copy of the stored portion of the one of the files.

13. A transmission system as in claim **10**, further comprising library means for storing and supplying to the identification encoding means items containing information.

14. A method of distributing audio/video information comprising:

transmitting compressed, digitized data representing a complete copy of at least one item of audio/video information at a non-real time rate from a central processing location;

receiving the transmitted compressed, digitized data representing a complete copy of the at least one item of audio/video information, at a local distribution system remote from the central processing location;

storing the received compressed digitized data representing the complete copy of the at least one item at the local distribution system;

in response to the stored compressed, digitized data, transmitting a representation of the at least one item at a real-time rate to at least one of a plurality of subscriber receiving stations coupled to the local distribution system; and

decompressing the compressed, digitized data representing the at least one item of audio/video information after the transmission step wherein the decompressing step is performed in the local distribution system to produce the representation of the at least one item for transmission to the at least one subscriber station;

wherein the transmitting step comprises:

inputting an item having information into the transmission system;

assigning a unique identification code to the item having information;

formatting the item having information as a sequence of addressable data blocks;

compressing the formatted and sequenced data blocks;

storing, as a file, the compressed, formatted, and sequenced data blocks with the assigned unique identification code; and

sending at least a portion of the file at the non-real time rate to the local distribution system.

15. A method as recited in claim **14**, wherein the inputting step comprises inputting the item having information as blocks of digital data.

16. A method as recited in claim **14**, wherein the inputting step comprises: inputting the item having information as an analog signal; and converting the analog signal to blocks of digital data.

17. A method of distributing audio/video information comprising:

formatting items of audio/video information as compressed digitized data at a central processing location;

transmitting compressed, digitized data representing a complete copy of at least one item of audio/video information from the central processing location;

receiving the transmitted compressed, digitized data representing a complete copy of the at least one item of audio/video information, at a local distribution system;

storing the received compressed, digitized data representing the complete copy of the at least one item at a local distribution system; and

using the stored compressed, digitized data to transmit a representation of the at least one item to at a plurality of subscriber receiving stations coupled to the local distribution system;

wherein the formatting step comprises:

inputting an item having information into the transmission system;

assigning a unique identification code to the item having information;

formatting the item having information as a sequence of addressable data blocks; and

compressing the formatted and sequenced data blocks.

18. A method as recited in claim **17**, wherein the inputting step comprises inputting the item having information as blocks of digital data.

19. A method as recited in claim **17**, wherein the inputting step comprises:

inputting the item having information as an analog signal and converting the analog signal to blocks of digital data.

* * * * *

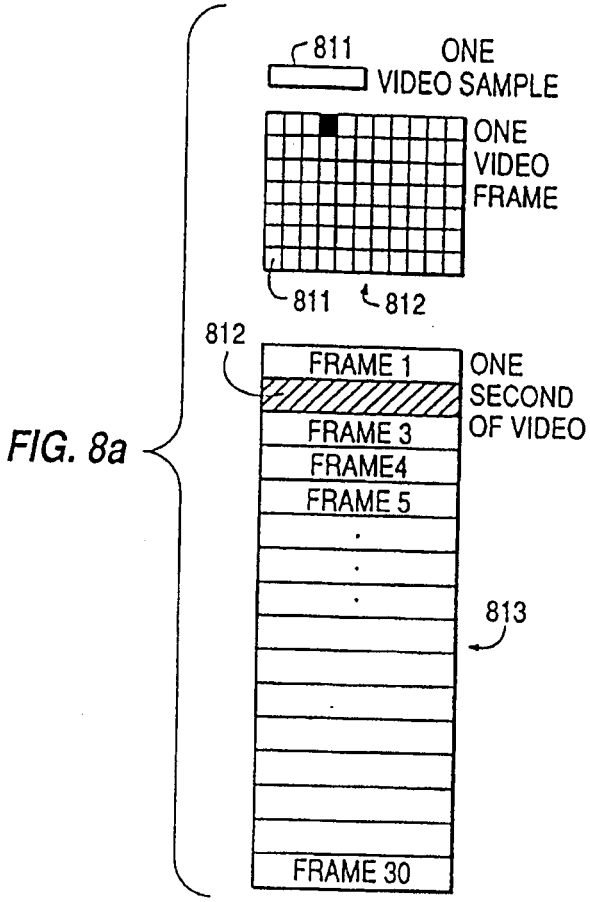

811
ONE
VIDEO SAMPLE
ONE
VIDEO
FRAME
811
812
812
FRAME 1
FRAME 3
FRAME4
FRAME 5
FRAME 30
ONE
SECOND
OF VIDEO
813

FIG. 8a

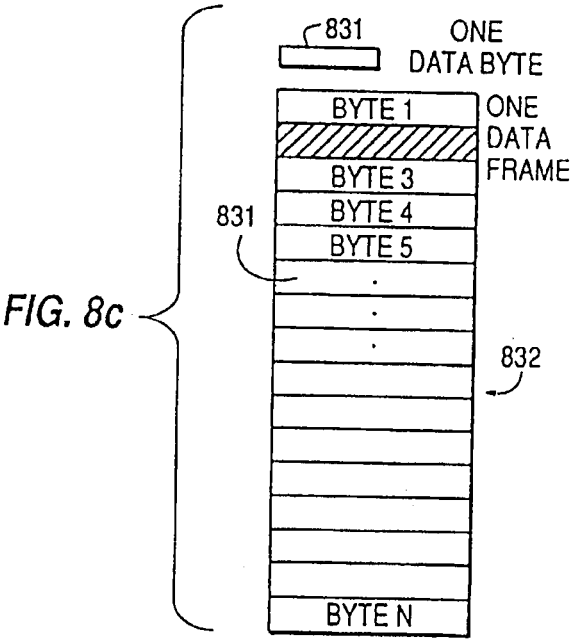

831
ONE
DATA BYTE
BYTE 1
BYTE 3
BYTE 4
BYTE 5
BYTE N
ONE
DATA
FRAME
831
832

FIG. 8c

EXHIBIT

8

US005253275A

United States Patent [19]

Yurt et al.

[11] Patent Number: 5,253,275

[45] Date of Patent: * Oct. 12, 1993

[54] **AUDIO AND VIDEO TRANSMISSION AND RECEIVING SYSTEM**

[75] Inventors: **Paul Yurt**, Scottsdale, Ariz.; **H. Lee Browne**, Two Soundview Dr., Greenwich, Conn. 06830

[73] Assignee: **H. Lee Browne**, D/B/A Greenwich Information Technologies, Greenwich, Conn.

[*] Notice: The portion of the term of this patent subsequent to Jul. 21, 2009 has been disclaimed.

[21] Appl. No.: **862,508**

[22] Filed: **Apr. 2, 1992**

Related U.S. Application Data

[63] Continuation of Ser. No. 637,562, Jan. 7, 1991, Pat. No. 5,132,992.

[51] **Int. Cl.**[5] **H04B 1/66**

[52] **U.S. Cl.** **375/122**; 358/86; 455/5.1

[58] **Field of Search** 375/122; 358/335, 133, 358/86, 84, 102, 903; 360/8, 9.1, 14.1; 455/2-5.1

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Primary Examiner—Stephen Chin

Attorney, Agent, or Firm—Finnegan, Henderson, Farabow, Garrett & Dunner

[57] **ABSTRACT**

A system of distributing video and/or audio information employs digital signal processing to achieve high rates of data compression. The compressed and encoded audio and/or video information is sent over standard telephone, cable or satellite broadcast channels to a receiver specified by a subscriber of the service, preferably in less than real time, for later playback and optional recording on standard audio and/or video tape.

7 Claims, 12 Drawing Sheets

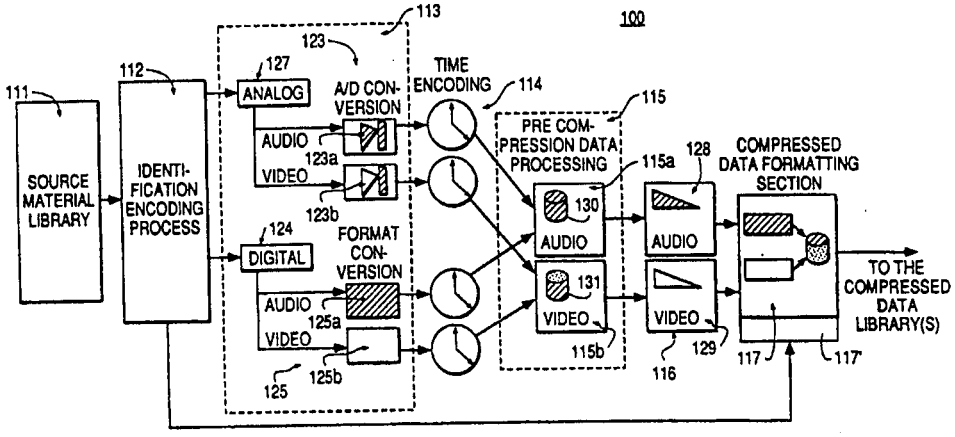


FIG. 1a

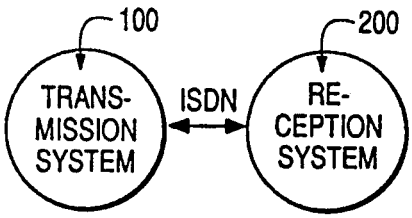


FIG. 1b

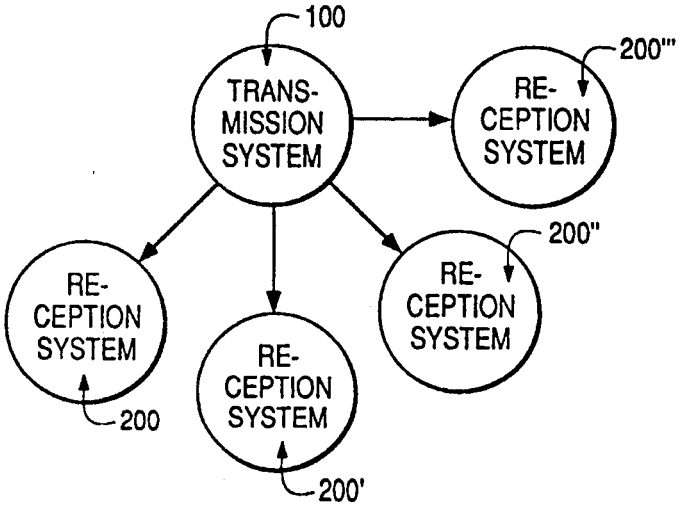
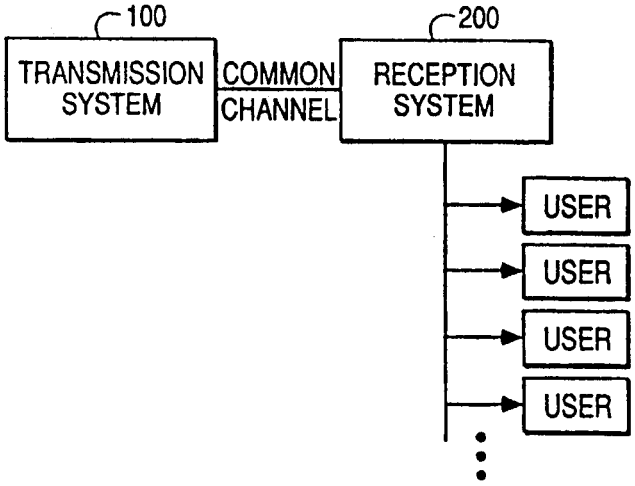


FIG. 1d



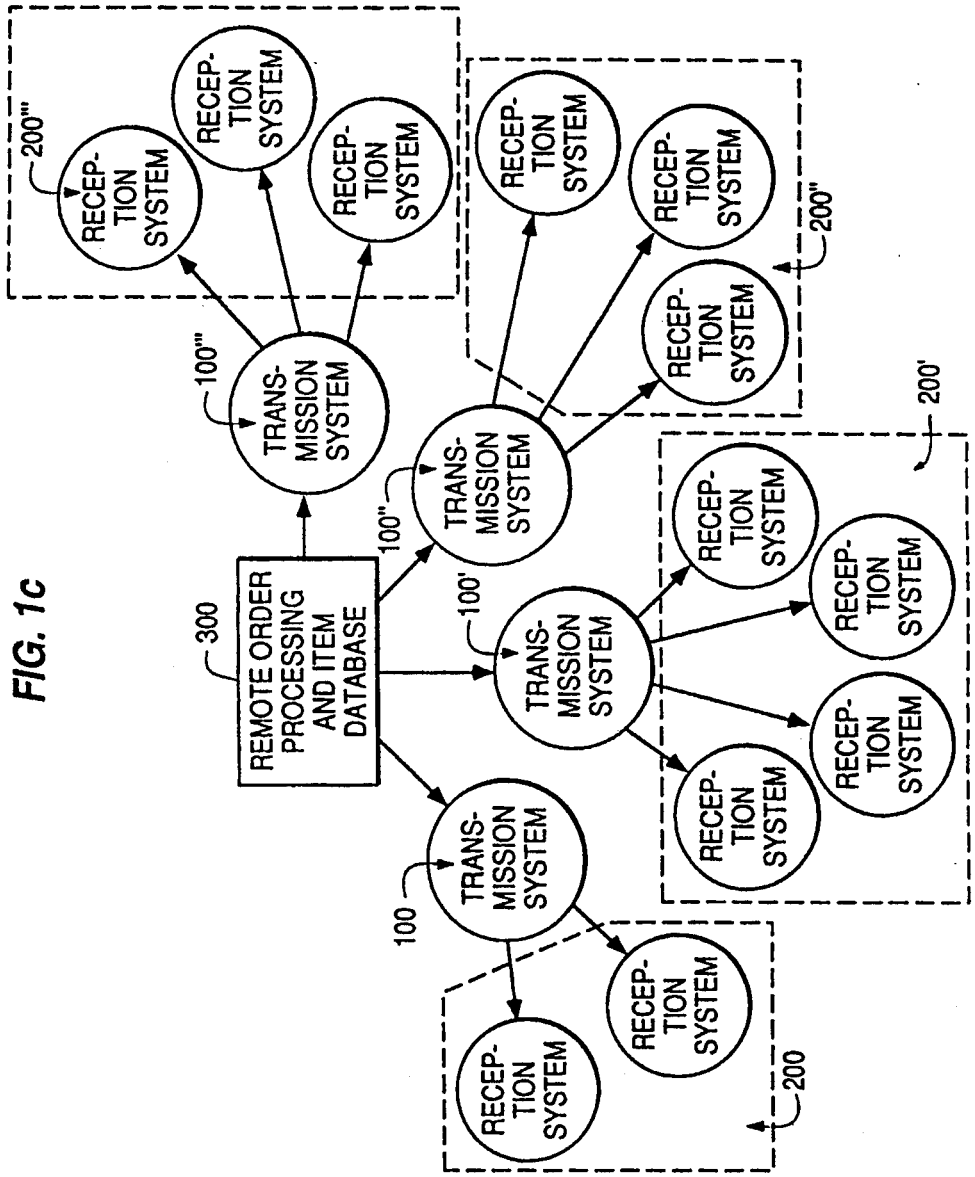

REMOTE ORDER PROCESSING AND ITEM DATABASE
300
TRANS-MISSION SYSTEM
100
100'
100"
100'''
RECEP-TION SYSTEM
200
200'
200"
200'''

FIG. 1c

FIG. 1e

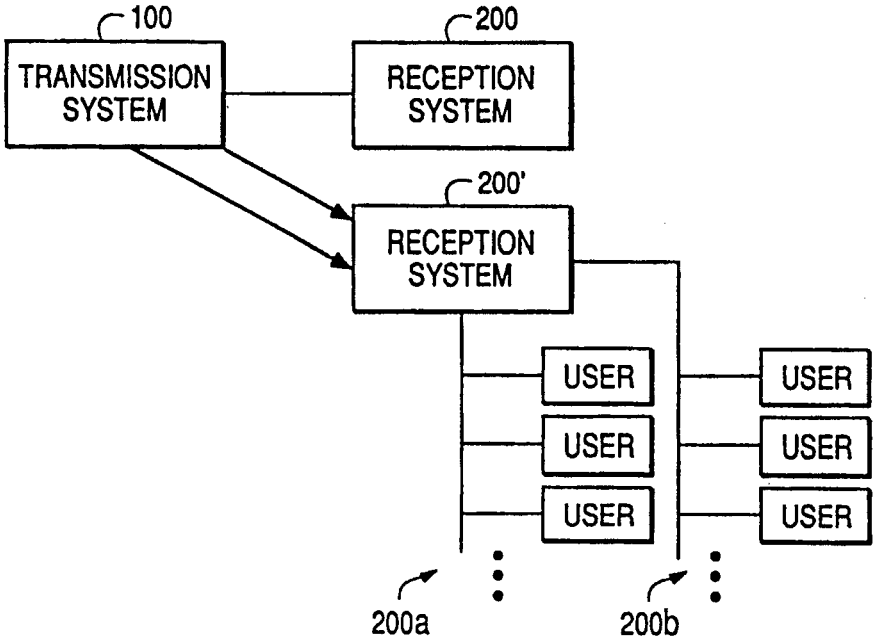

100
TRANSMISSION SYSTEM
200
RECEPTION SYSTEM
200'
RECEPTION SYSTEM
USER
USER
USER
USER
USER
USER
200a
200b

FIG. 1f

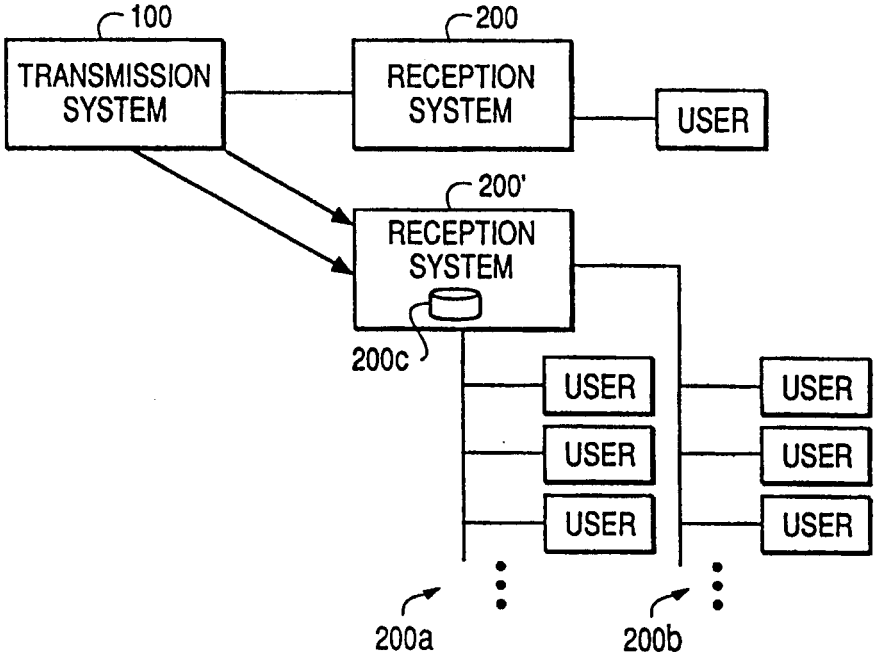

100
TRANSMISSION SYSTEM
200
RECEPTION SYSTEM
USER
200'
RECEPTION SYSTEM
200c
USER
USER
USER
USER
USER
USER
200a
200b

FIG. 1g

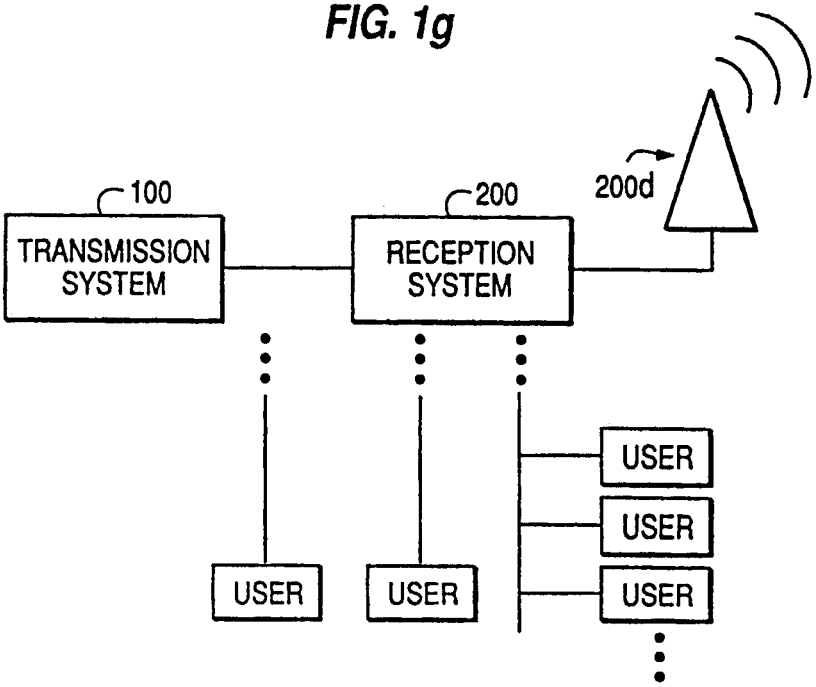
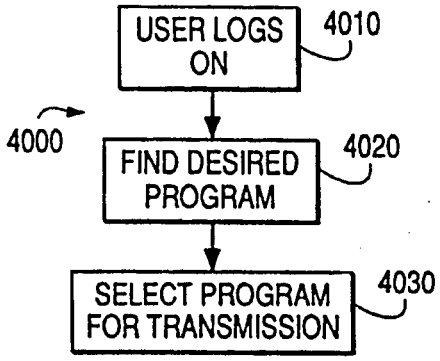

100
TRANSMISSION SYSTEM
200
RECEPTION SYSTEM
200d
USER
USER
USER
USER
USER

FIG. 4


USER LOGS ON
4010
4000
FIND DESIRED PROGRAM
4020
SELECT PROGRAM FOR TRANSMISSION
4030

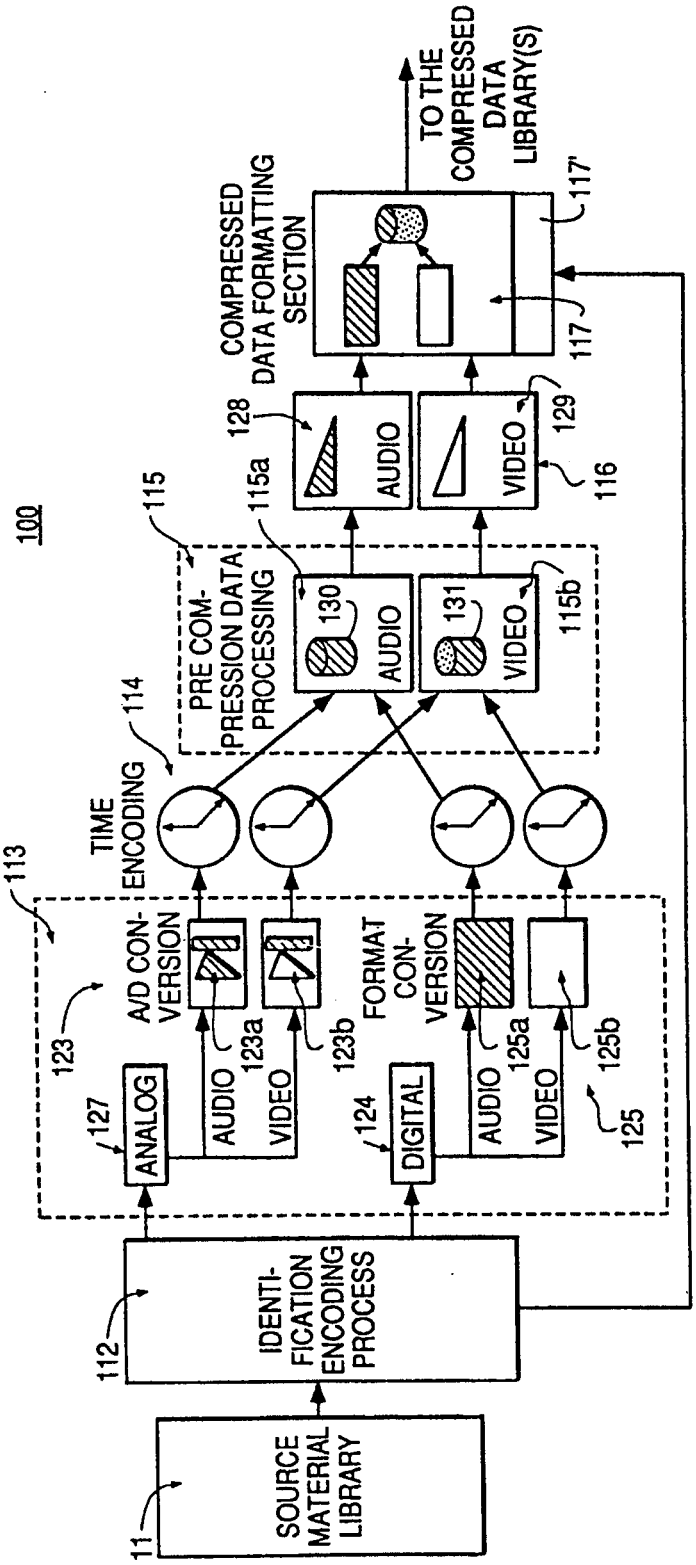

100
11
SOURCE MATERIAL LIBRARY
112
IDENTI-FICATION ENCODING PROCESS
113
123
127
ANALOG
A/D CON-VERSION
AUDIO
123a
VIDEO
123b
124
DIGITAL
FORMAT CON-VERSION
AUDIO
125a
VIDEO
125b
125
TIME ENCODING
114
PRE COM-PRESSION DATA PROCESSING
115
115a
130
AUDIO
131
VIDEO
115b
128
AUDIO
129
VIDEO
116
COMPRESSED DATA FORMATTING SECTION
117
117'
TO THE COMPRESSED DATA LIBRARY(S)

FIG. 2a

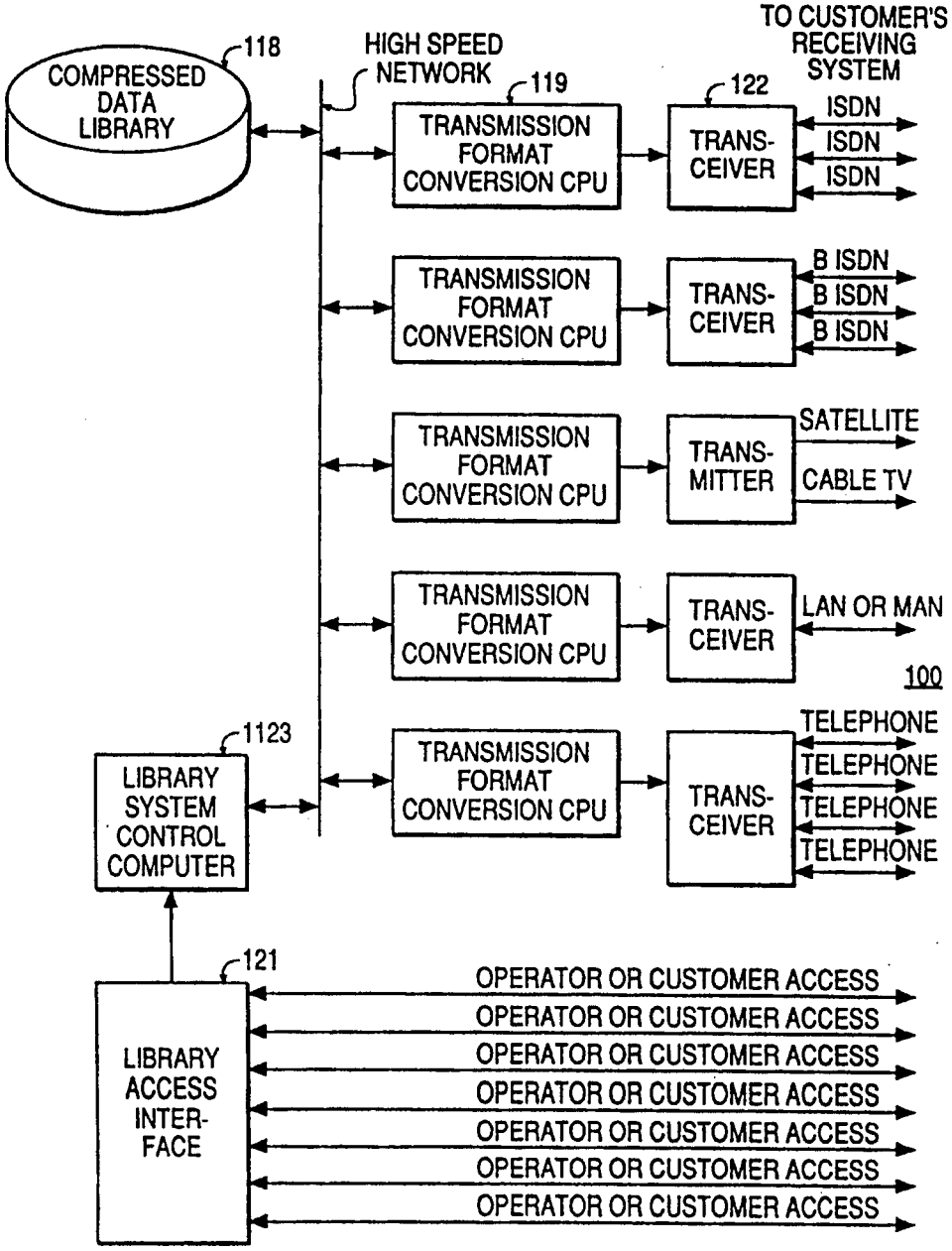

118
COMPRESSED DATA LIBRARY
HIGH SPEED NETWORK
119
TRANSMISSION FORMAT CONVERSION CPU
122
TRANS-CEIVER
TO CUSTOMER'S RECEIVING SYSTEM
ISDN
ISDN
ISDN
TRANSMISSION FORMAT CONVERSION CPU
TRANS-CEIVER
B ISDN
B ISDN
B ISDN
TRANSMISSION FORMAT CONVERSION CPU
TRANS-MITTER
SATELLITE
CABLE TV
TRANSMISSION FORMAT CONVERSION CPU
TRANS-CEIVER
LAN OR MAN
100
1123
LIBRARY SYSTEM CONTROL COMPUTER
TRANSMISSION FORMAT CONVERSION CPU
TRANS-CEIVER
TELEPHONE
TELEPHONE
TELEPHONE
TELEPHONE
121
LIBRARY ACCESS INTER-FACE
OPERATOR OR CUSTOMER ACCESS
OPERATOR OR CUSTOMER ACCESS
OPERATOR OR CUSTOMER ACCESS
OPERATOR OR CUSTOMER ACCESS
OPERATOR OR CUSTOMER ACCESS
OPERATOR OR CUSTOMER ACCESS
OPERATOR OR CUSTOMER ACCESS

FIG. 2b

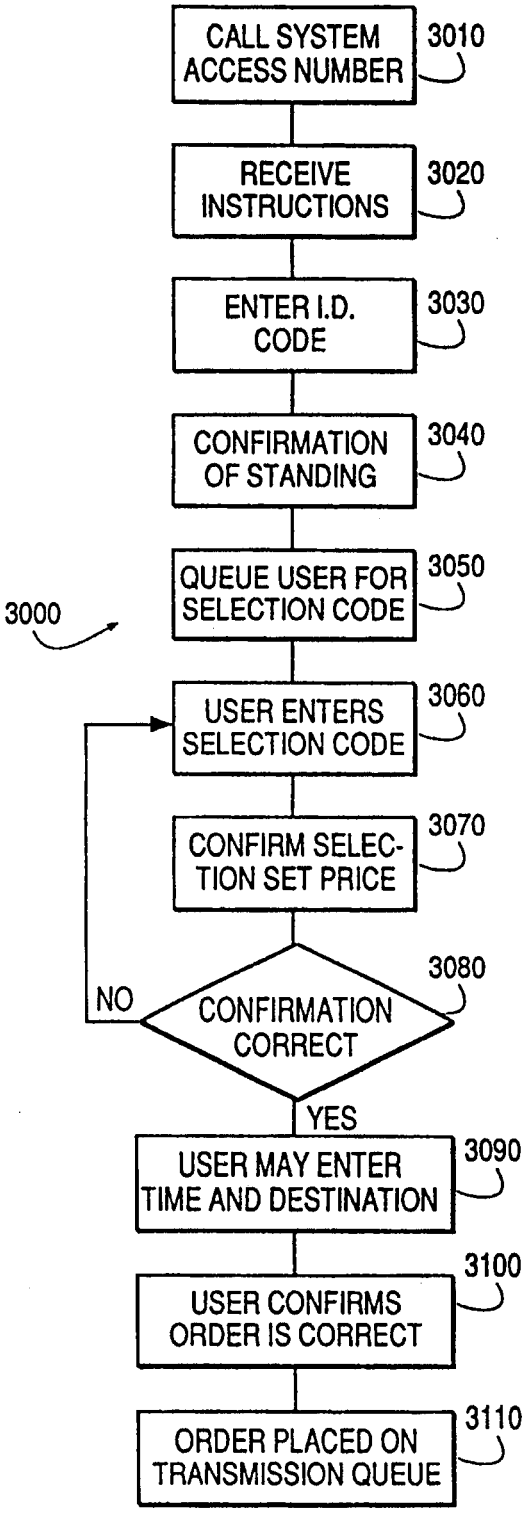

CALL SYSTEM ACCESS NUMBER
3010
RECEIVE INSTRUCTIONS
3020
ENTER I.D. CODE
3030
CONFIRMATION OF STANDING
3040
QUEUE USER FOR SELECTION CODE
3050
3000
USER ENTERS SELECTION CODE
3060
CONFIRM SELECTION SET PRICE
3070
CONFIRMATION CORRECT
3080
NO
YES
USER MAY ENTER TIME AND DESTINATION
3090
USER CONFIRMS ORDER IS CORRECT
3100
ORDER PLACED ON TRANSMISSION QUEUE
3110

FIG. 3

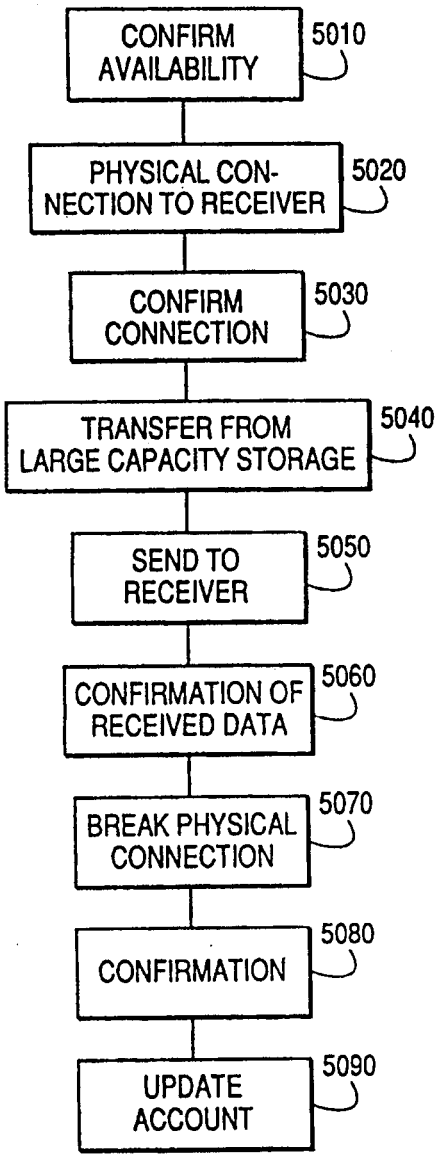

CONFIRM AVAILABILITY
5010
PHYSICAL CONNECTION TO RECEIVER
5020
CONFIRM CONNECTION
5030
TRANSFER FROM LARGE CAPACITY STORAGE
5040
SEND TO RECEIVER
5050
CONFIRMATION OF RECEIVED DATA
5060
BREAK PHYSICAL CONNECTION
5070
CONFIRMATION
5080
UPDATE ACCOUNT
5090

FIG. 5

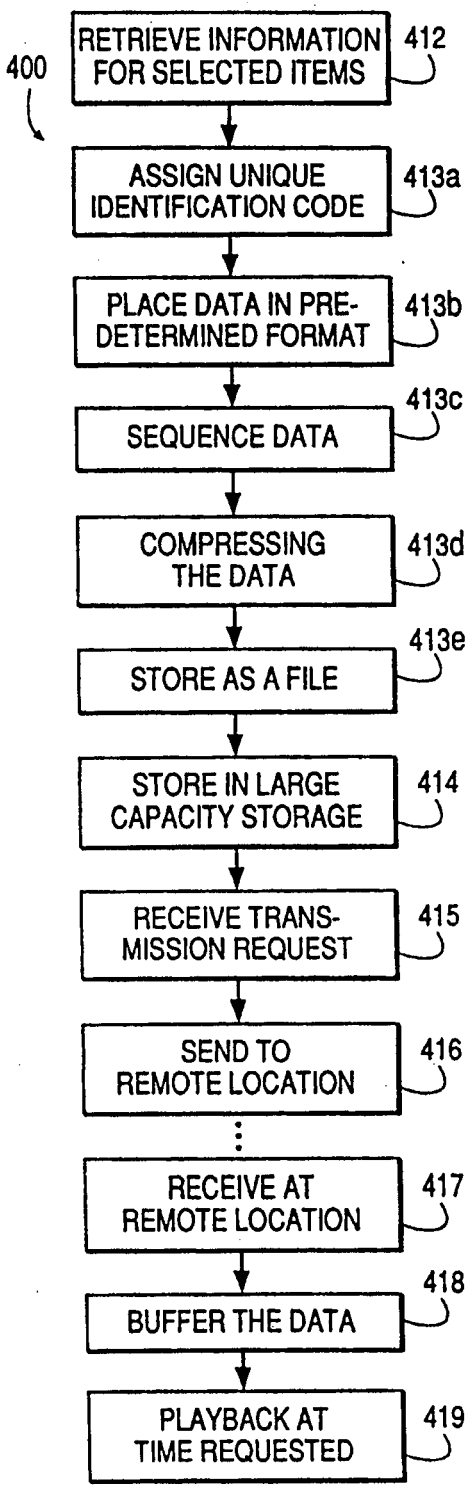

400
RETRIEVE INFORMATION FOR SELECTED ITEMS
412
ASSIGN UNIQUE IDENTIFICATION CODE
413a
PLACE DATA IN PREDETERMINED FORMAT
413b
SEQUENCE DATA
413c
COMPRESSING THE DATA
413d
STORE AS A FILE
413e
STORE IN LARGE CAPACITY STORAGE
414
RECEIVE TRANSMISSION REQUEST
415
SEND TO REMOTE LOCATION
416
RECEIVE AT REMOTE LOCATION
417
BUFFER THE DATA
418
PLAYBACK AT TIME REQUESTED
419

FIG. 7

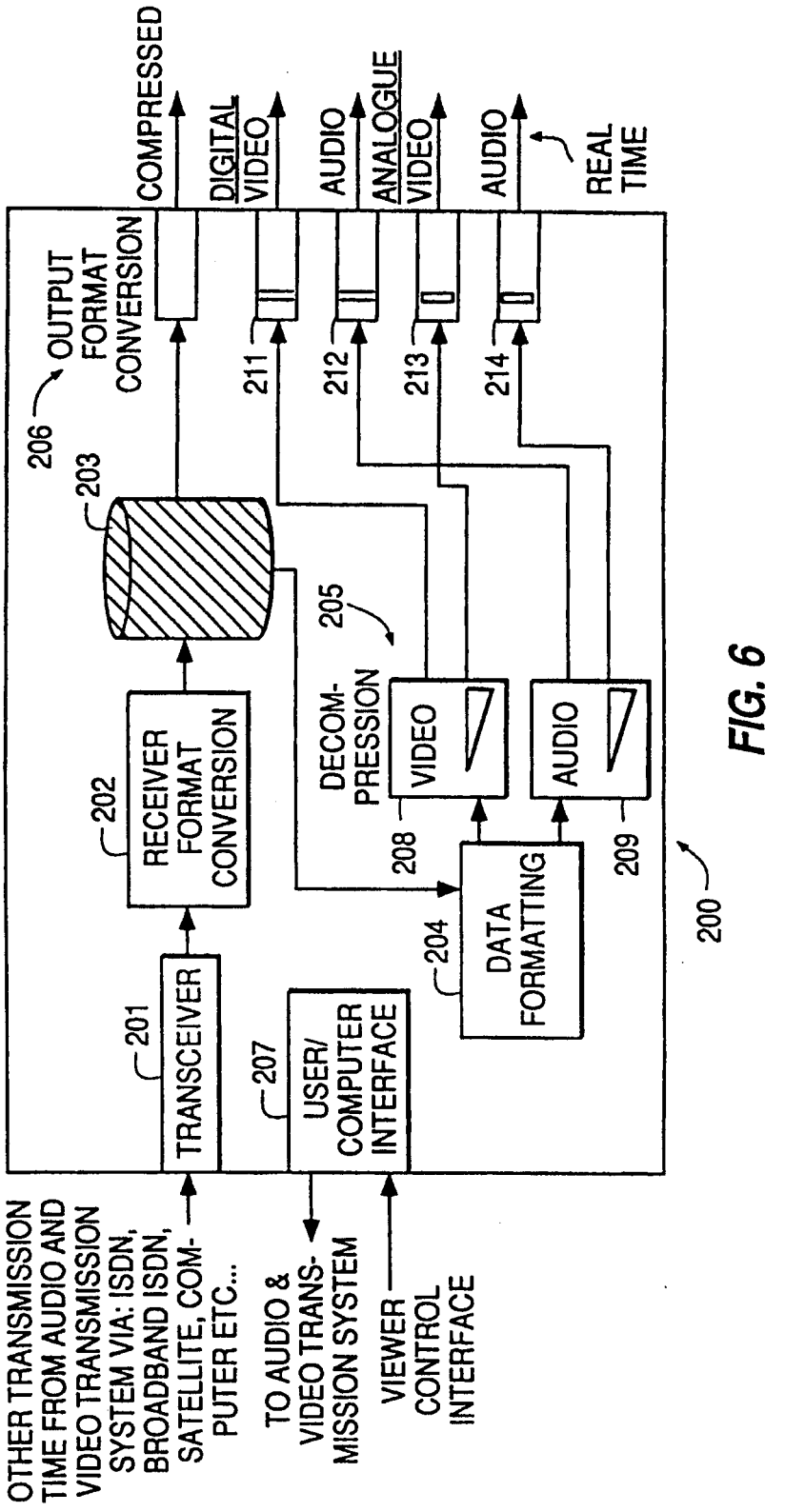

COMPRESSED
DIGITAL VIDEO
AUDIO
ANALOGUE VIDEO
AUDIO
REAL TIME
OUTPUT FORMAT CONVERSION
206
203
211
212
213
214
205
DECOM-PRESSION
VIDEO
AUDIO
RECEIVER FORMAT CONVERSION
202
208
209
200
DATA FORMATTING
204
TRANSCEIVER
201
USER/ COMPUTER INTERFACE
207
OTHER TRANSMISSION TIME FROM AUDIO AND VIDEO TRANSMISSION SYSTEM VIA: ISDN, BROADBAND ISDN, SATELLITE, COM-PUTER ETC...
TO AUDIO & VIDEO TRANS-MISSION SYSTEM
VIEWER CONTROL INTERFACE

FIG. 6

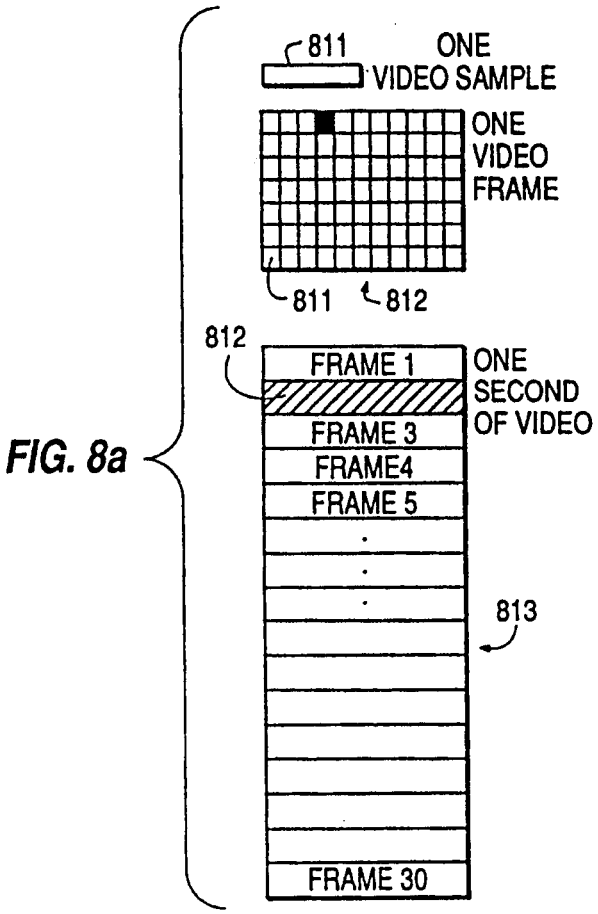

811
ONE
VIDEO SAMPLE
ONE
VIDEO
FRAME
811
812
812
FRAME 1
ONE
SECOND
OF VIDEO
FRAME 3
FRAME4
FRAME 5
813
FRAME 30

FIG. 8a

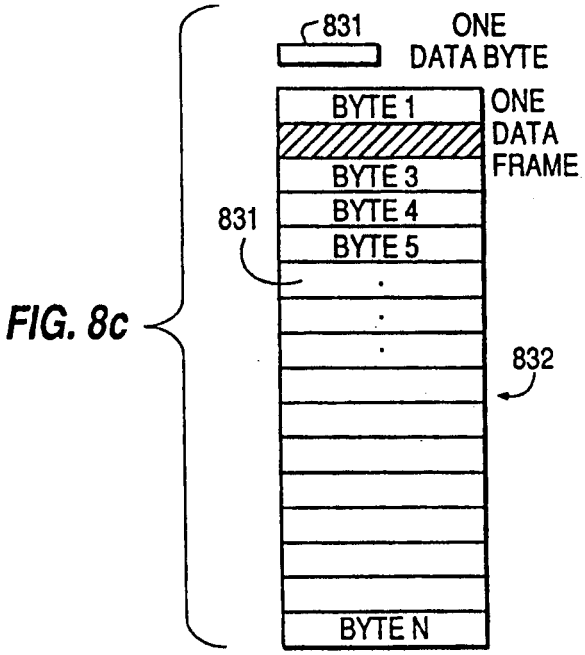

831
ONE
DATA BYTE
BYTE 1
ONE
DATA
FRAME
BYTE 3
BYTE 4
BYTE 5
831
832
BYTE N

FIG. 8c

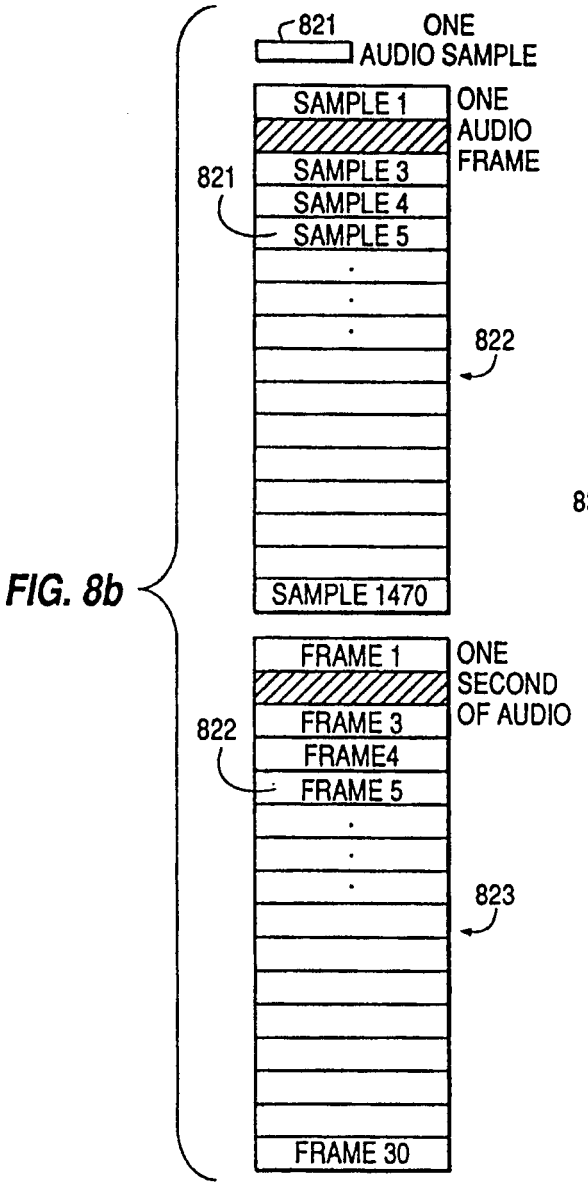

821
ONE AUDIO SAMPLE
SAMPLE 1
SAMPLE 3
SAMPLE 4
SAMPLE 5
SAMPLE 1470
ONE AUDIO FRAME
821
822
FRAME 1
FRAME 3
FRAME4
FRAME 5
FRAME 30
ONE SECOND OF AUDIO
822
823

FIG. 8b

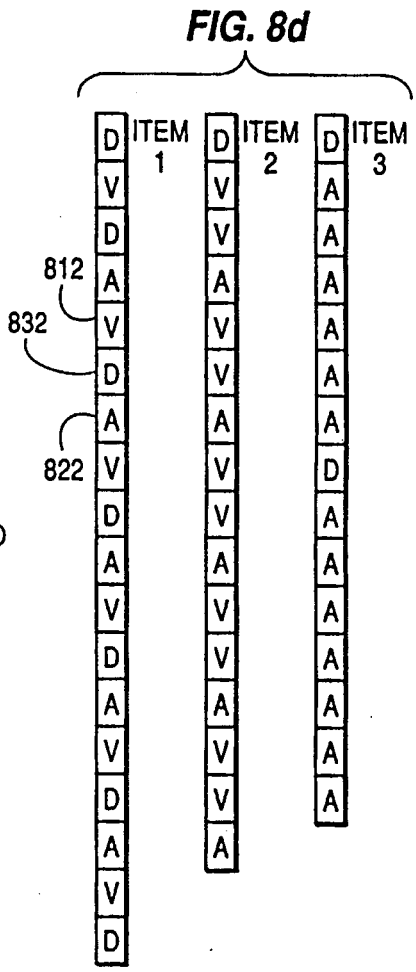

ITEM 1
ITEM 2
ITEM 3
812
832
822

FIG. 8d

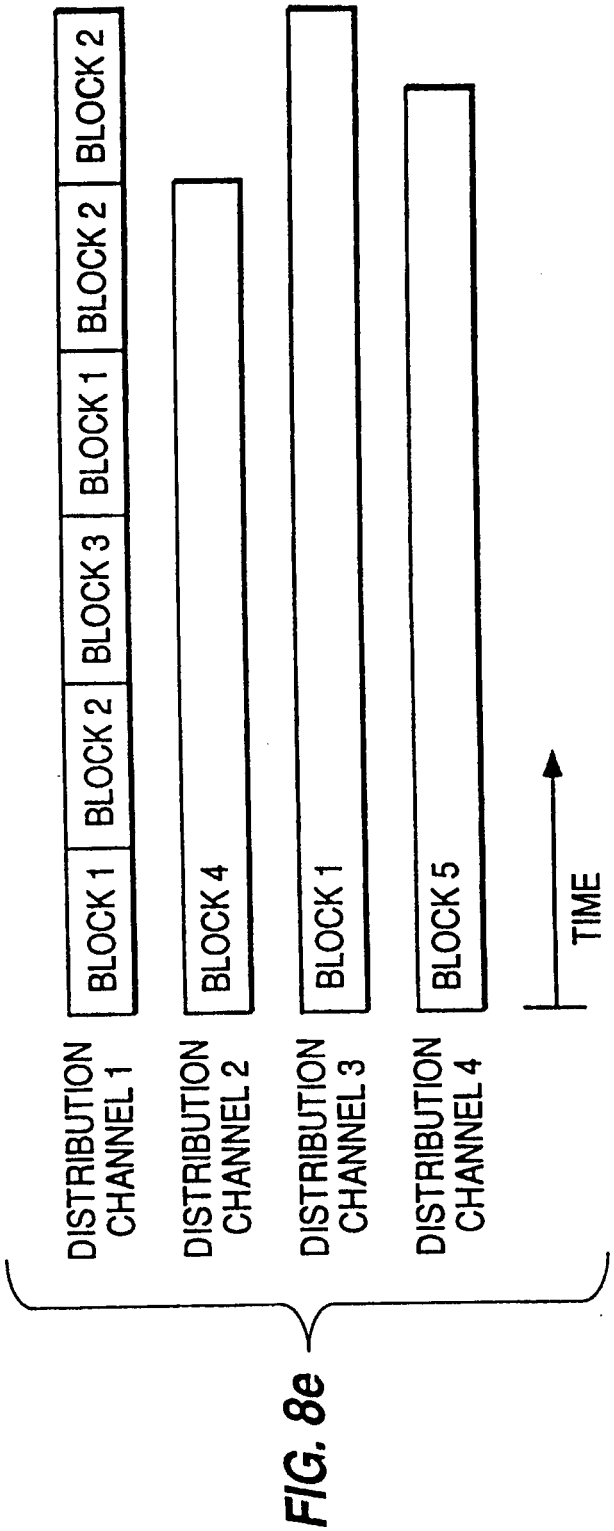

BLOCK 1
BLOCK 2
BLOCK 3
BLOCK 1
BLOCK 2
BLOCK 2
BLOCK 4
BLOCK 1
BLOCK 5
TIME
DISTRIBUTION CHANNEL 1
DISTRIBUTION CHANNEL 2
DISTRIBUTION CHANNEL 3
DISTRIBUTION CHANNEL 4

FIG. 8e

AUDIO AND VIDEO TRANSMISSION AND RECEIVING SYSTEM

This is a continuation of application Ser. No. 07/637,562, filed Jan. 7, 1991 U.S. Pat. No. 5,132,992.

BACKGROUND OF THE INVENTION

The present invention relates generally to an audio and video transmission and receiving system, and more specifically to such a system in which the user controls the access and the playback operations of selected material.

At the present time, only a video cassette recorder (VCR) or a laser disk player (LDP) allow a viewer to enjoy control over selection of particular audio/video material. Using either a VCR or an LDP requires the viewer to obtain a video tape either by rental or by purchase. Remote accessing of the material has not yet been integrated into an efficient system.

Several designs have been developed which provide the viewer with more convenient means of accessing material. One such design is disclosed in U.S. Pat. No. 4,506,387, issued to Walter. The Walter patent discloses a fully dedicated, multi-conductor, optical cable system that is wired to the viewer's premises. While the system affords the viewer some control over accessing the material, it requires that a location designated by the viewer be wired with a dedicated cable. The Walter system further requires the viewer be at that location for both ordering and viewing the audio/video material.

U.S. Pat. No. 4,890,320, issued to Monslow, describes a system which broadcasts viewer selected material to a viewer at a prescribed time. This system is limited in that it requires multiple viewers in multiple locations to view the audio/video material at the time it is broadcast, rather than allowing each viewer to choose his or her own viewing time. The system disclosed in Monslow also does not allow for the stop, pause, and multiple viewing functions of existing VCR technology.

U.S. Pat. No. 4,590,516, issued to Abraham, discloses a system that uses a dedicated signal path, rather than multiple common carriers, to transmit audio/video programming. The receiver has no storage capability. The system provides for only display functions, which limits viewing to the time at which the material is ordered. Like Monslow, the Abraham system does not allow for the stop, pause, and multiple viewing functions of existing VCR technology.

U.S. Pat. No. 4,963,995, issued to Lang, discloses an audio/video transceiver with the capability of editing and/or copying from one video tape to another using only a single tape deck. Lang does not disclose a system with one or more libraries wherein a plurality of system subscribers may access information stored in the film and tape library or libraries, and play back the selected information at a time and place selected by the subscriber.

It is therefore an object of the present invention to provide a user with the capability of accessing audio/video material by integrating both accessing and playback controls into a system that can use multiple existing communications channels.

It is a further object of the present invention to provide a picture and sound transmission system which allows the user to remotely select audio/video material from any location that has either telephone service or a computer.

A still further object of the present invention is to provide a picture and sound transmission system wherein the selected audio/video material is sent over any one of several existing communication channels in a fraction of real time to any location chosen by the user that has a specified receiver.

Another object of the present invention is to provide a picture and sound transmission system wherein the user may play back the selected audio/video material at any time selected by the user and retain a copy of the audio/video material for multiple playbacks in the future.

Another object of the present invention is to provide a picture and sound transmission system wherein the information requested by the user may be sent as only audio information, only video information, or as a combination of audio and video information.

Additional objects and advantages of the invention will be set forth in the description which follows, and in part will be obvious from the description, or may be learned by practice of the invention. The objects and advantages of the invention may be realized and obtained by means of the instrumentalities and combinations particularly pointed out in the appended claims.

SUMMARY OF THE INVENTION

To achieve the objects in accordance with the purposes of the present invention, as embodied and described herein, the transmission and receiving system for providing information to remote locations comprises source material library means prior to identification and compression; identification encoding means for retrieving the information for the items from the source material library means and for assigning a unique identification code to the retrieved information; conversion means, coupled to identification encoding means, for placing the retrieved information into a predetermined format as formatted data; ordering means, coupled to the conversion means, for placing the formatted data into a sequence of addressable data blocks; compression means, coupled to the ordering means, for compressing the formatted and sequenced data; compressed data storing means, coupled to the compression means, for storing as a file the compressed sequenced data received from the compression means with the unique identification code assigned by the identification encoding means; and transmitter means, coupled to the compressed data storing means, for sending at least a portion of a specific file to a specific one of the remote locations.

The present invention further comprises a distribution method responsive to requests identifying information to be sent from a transmission system to a remote location, the method comprising the steps of storing audio and video information in a compressed data form; requesting transmission, by a user, of at least a part of the stored compressed information to the remote location; sending at least a portion of the stored compressed information to the remote location; receiving the sent information at the remote location; buffering the processed information at the remote location; and playing back the buffered information in real time at a time requested by the user.

Additionally, the present invention comprises a receiving system responsive to a user input identifying a choice of an item stored in a source material library to be played back to the subscriber at a location remote

from the source material library, the item containing information to be sent from a transmitter to the receiving system, and wherein the receiving system comprises transceiver means for automatically receiving the requested information from the transmitter as compressed formatted data blocks; receiver format conversion means, coupled to the transceiver means, for converting the compressed formatted data blocks into a format suitable for storage and processing resulting in playback in real time; storage means, coupled to the receiver format conversion means, for holding the compressed formatted data; decompressing means, coupled to the receiver format conversion means, for decompressing the compressed formatted information; and output data conversion means, coupled to the decompressing means, for playing back the decompressed information in real time at a time specified by the user.

BRIEF DESCRIPTION OF THE DRAWINGS

The accompanying drawings, which are incorporated in and constitute a part of the specification, illustrate the presently preferred apparatus and method of the invention and, together with the general description given above and the detailed description of the preferred embodiment given below serve to explain the principles of the invention. In the drawings:

FIGS. 1*a*–1*g* are high level block diagrams showing different configurations of the transmission and receiving system of the present invention;

FIGS. 2*a* and 2*b* are detailed block diagrams of preferred implementations of the transmission system of the present invention;

FIG. 3 is a flowchart of a preferred method of ordering a selection from a library in accordance with the present invention;

FIG. 4 is a flowchart of a preferred method of user request via a user interface of the present invention;

FIG. 5 is a flowchart of a preferred method of implementing a queue manager program of the present invention;

FIG. 6 is a block diagram of a preferred implementation of the receiving system of the present invention;

FIG. 7 is a flowchart of a preferred method of distribution of the present invention; and

FIGS. 8*a*–8*e* are block diagrams of preferred implementations of data structures and data blocking for items in the audio and video distribution system of the present invention.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

FIGS. 1*a*–1*g* are high level block diagrams showing different configurations of the transmission and receiving system of the present invention. FIGS. 1*a*, 1*b*, 1*d*, 1*e*, 1*f*, and 1*g* each show transmission system **100**, described in more detail below with respect to FIGS. 2*a* and 2*b*. A user of the transmission and receiving system of the present invention preferably accesses transmission system **100** by calling a phone number or by typing commands into a computer. The user then chooses audio and/or video material from a list of available items which he or she wants to listen to and/or watch.

As shown in FIG. 1*a*, the transmission and receiving system may preferably comprise a peer to peer configuration where one transmission system **100** communicates with one reception system **200**. As shown in FIG. 1*b*, the transmission and receiving system of the present invention may alternatively comprise a plurality of reception systems **200**, **200'**, **200''**, and **200'''**, which are each associated with a single transmission system **100**.

FIG. 1*c* shows a high level block diagram of the transmission and receiving system of the present invention including remote order processing and item database **300**, described in more detail with respect to FIG. **3**. Remote order processing and item database **300** preferably enables users to access desired items by remote communication. The remote order processing and item database **300** may communicate with a plurality of transmission systems **100**, **100'**, **100''**, and **100'''**, each of which communicates with a respective set of reception systems **200**, **200'**, **200''**, and **200'''**. Each of the reception systems in sets **200**, **200'**, **200''**, and **200'''** may preferably communicate with a plurality of users.

FIG. 1*d* shows a high level block diagram of the transmission and receiving system of the present invention including a transmission system **100** distributing to a plurality of users via a reception system **200** configured as a cable television system.

FIG. 1*e* shows a high level block diagram of the transmission and receiving system of the present invention including a transmission system **100** distributing to a plurality reception systems **200** and **200'**. In the configuration shown in FIG. 1*e*, reception system **200** is a direct connection system wherein a user is directly connected to transmission system **100**. Reception system **200'** preferably includes a first cable television system **200***a* and a second cable television system **200***b*. Users of cable television systems **200***a* and **200***b* are indirectly connected to transmission system **100**.

FIG. 1*f* shows a high level block diagram of the transmission and receiving system of the present invention including transmission system **100** distributing via several channels to reception systems **200** and **200'**. Reception system **200** is preferably non-buffering. In such a system, users are directly connected to transmission system **100**, as in reception system **200** in FIG. 1*e*.

Reception system **200'** shown in FIG. 1*f* is a cable television system, as shown in reception system **200'** of FIG. 1*e*. In FIG. 1*f*, the reception system **200'** is preferably buffering, which means that users may receive requested material at a delayed time. The material is buffered in intermediate storage device **200***c* in reception system **200'**.

In the configuration of FIG. 1*f*, decompression of the requested material may preferably occur at the head end of a cable television reception system **200'**. Thus, distribution may be provided to users via standard television encoding methods downstream of the head end of the cable distribution system. This method is preferred for users who only have cable television decoders and standard television receivers.

FIG. 1*g* shows a high level block diagram of the transmission and receiving system of the present invention including transmission system **100** distributing to a reception system **200**, which then preferably transmits requested material over airwave communication channels **200***d*, to a plurality of users. The transmission and receiving system shown in FIG. 1*g* may preferably transmit either compressed or uncompressed data, depending on the requirements and existing equipment of the user. The airwave transmission and receiving system shown in FIG. 1*g* may preferably employ either VHF, UHF or satellite broadcasting systems.

With respect to the transmission and receiving systems set forth in FIGS. 1*a*–1*g*, the requested material may be fully compressed and encoded, partly decom-

pressed at some stage in transmission system **100**, or fully decompressed prior to transmission. The reception systems **200** may either buffer the requested material for later viewing, or decompress in real time the requested material as it is distributed by transmission system **100**. Alternatively, the reception systems **200** of the present invention may perform a combination of buffering and non-buffering by buffering some of the requested material and decompressing the remainder of the requested material for immediate viewing as it is distributed by transmission system **100**.

In direct connection configurations, such as reception systems **200** shown in FIGS. **1***e* and **1***f*, the user preferably selects the reception system **200** to which the requested material is sent, and optionally selects the time playback of the requested material as desired. Accordingly, the user may remotely access the transmission system **100** from a location different than the location of reception system **200** where the material will be sent and/or played back. Thus, for example, a user may preferably call transmission system **100** from work and have movie sent to their house to be played back after dinner or at any later time of their choosing.

In non-direct connection reception systems such as shown in reception system **200'** of FIG. **1***f*, intermediate storage device **200***c* may preferably include, for example, sixteen hours of random access internal audio and video storage. A reception system with such storage is capable of storing several requested items for future playback. The user could then view and/or record a copy of the decompressed requested material in real time, or compressed in non-real time, at a time of their choosing. Accordingly, the user would not have to make a trip to the store to purchase or rent the requested material.

In any of the transmission and receiving systems illustrated in FIGS. **1***a*-**1***g*, the requested material may be copy protected. To achieve copy protection, the requested material, as an item, is encoded as copy protected during storage encoding in transmission system **100**. The user may then play back the item only one time. The user may also optionally review select portions of the item prior to its automatic erasure from the memory of the reception system **200**. In this way, requested material may be distributed to "view only" users and also to "view and copy" users who wish to retain copies of the distributed items.

Copy protected programs, when decompressed and played back, would have a copy protection technique applied to the analog and digital output signals. The analog video output is protected from copying through the use of irregular sync signals, which makes the signal viewable on a standard television but not recordable on a audio/video recorder. Digital output protection is effected through copy protect bit settings in the digital output signal, thus preventing a compatible digital recorder from recording the digital audio and/or video signal stream. A protected item will not be passed to the compressed data port of the digital recorder for off line storage.

FIGS. **2***a* and **2***b* illustrate detailed block diagrams of preferred implementations of the transmission system **100** of the present invention. Transmission system **100** may either be located in one facility or may be spread over a plurality of facilities. A preferred embodiment of transmission system **100** may preferably include only some of the elements shown in FIGS. **2***a* and **2***b*.

Transmission system **100** of a preferred embodiment of the present invention preferably includes source material library means for temporary storage of items prior to conversion and storage in a compressed data library means. The items of information may include analog and digital audio and video information as well as physical objects such as books and records which require conversion to a compatible media type before converting, compressing and storing their audio and video data in the compressed data library means.

As shown in FIG. **2***a*, the source material library means included in transmission system **100** preferably includes a source material library **111**. The source material library **111** may include different types of materials including television programs, movies, audio recordings, still pictures, files, books, computer tapes, computer disks, documents of various sorts, musical instruments, and other physical objects. These materials are converted to or recorded on a media format compatible to the digital and analog inputs of the system prior to being compressed and stored in a compressed data library **118**. The different media formats preferably include digital or analog audio and video tapes, laser disks, film images, optical disks, magnetic disks, computer tapes, disks and, cartridges.

The source material library **111**, according to a preferred embodiment of the present invention, may preferably include a single source material library or a plurality of source material libraries. If there are a plurality of source material libraries, they may be geographically located close together or may be located far apart. The plurality of source material libraries may communicate using methods and channels similar to the methods and channel types which libraries may employ for communication with the receiving system **200** of the user, or the source material libraries may communicate via any available method.

Prior to being made accessible to a user of the transmission and receiving system of the present invention, the item must be stored in at least one compressed data library **118**, and given a unique identification code by identification encoder **112**. Storage encoding, performed by identification encoder **112**, aside form giving the item a unique identification code, optionally involves logging details about the item, called program notes, and assigning the item a popularity code. Storage encoding may be performed just prior to conversion of the item for transmission to reception system **200**, at any time after starting the conversion process, or after storing the item in the compressed data library **118**.

In a preferred embodiment of the present invention, the method of encoding the information involves assigning a unique identification code and a file address to the item, assigning a popularity code, and inputting the program notes. This process is identical for any of the different media types stored in the source material library **111**.

The transmission system **100** of the present invention also preferably includes conversion means **113** for placing the items from source material library **111** into a predetermined format as formatted data. In the preferred embodiment, after identification encoding is performed by identification encoder **112**, the retrieved information is placed into a predetermined format as formatted data by the converter **113**. The items stored in source material library **111** and encoded by identification encoder **112** may be in either analog or digital form. Converter **113** therefore includes analog input receiver

127 and digital input receiver 124. If items have only one format, only one type of input receiver 124 or 127 is necessary.

When the information from identification encoder 112 is digital, the digital signal is input to the digital input receiver 124 where it is converted to a proper voltage. A formatter 125 sets the correct bit rates and encodes into least significant bit (lsb) first pulse code modulated (pcm) data. Formatter 125 includes digital audio formatter 125*a* and digital video formatter 125*b*. The digital audio information is input into a digital audio formatter 125*a* and the digital video information, if any, is input into digital video formatter 125*b*. Formatter 125 outputs the data in a predetermined format.

When the retrieved information from identification encoder 112 is analog, the information is input to an analog-to-digital converter 123 to convert the analog data of the retrieved information into a series of digital data bytes. Converter 123 preferably forms the digital data bytes into the same format as the output of formatter 125.

Converter 123 preferably includes an analog audio converter 123*a* and an analog video converter 123*b*. The analog audio converter 123*a* preferably converts the retrieved audio signal into pcm data samples at a fixed sampling rate. The analog video converter 123*b* preferably converts the analog video information, retrieved from identification encoder 123, into pcm data also at fixed sampling rates.

If the retrieved information being converted contains only audio information, then the audio signal is fed to the appropriate digital audio input or analog audio input. When the retrieved information contains both audio and video information, the audio and video signals are passed simultaneously to the audio and video converter inputs. Synchronization between the audio and video data can be maintained in this way.

If, for example, the retrieved information to be converted from the source material library 111 is a motion picture film, the picture frames in the film are passed through a digital telecine device to the digital input receiver 124. Format conversion is then preferably performed by digital video formatter 125*b*. Accompanying audio information is passed through an optical or magnetic digital playback device. This device is connected to digital audio formatter 125*a*.

In some cases, such as in inter-library transfers, incoming materials may be in a previously compressed form so that there is no need to perform compression by precompression processor 115 and compressors 128 and 129. In such a case, retrieved items are passed directly from identification encoder 112 to the compressed data formatter 117. The item database records, such as the program notes which may also be input from another system, to the compressed data formatting section 117, where this data, if necessary, is reformatted to make it compatible with the material stored in compressed data library 118. Such material may be received in the form of digital tapes or via existing communication channels and may preferably input directly to a short term storage 117′ in the compressed data formatting section 117.

The transmission system 100 of the present invention also preferably includes ordering means for placing the formatted information into a sequence of addressable data blocks. As shown in FIG. 2*a*, the ordering means in the preferred embodiment includes time encoder 114. After the retrieved information is converted and formatted by the converter 113, the information may be time encoded by the time encoder 114. Time encoder 114 places the blocks of converted formatted information from converter 113 into a group of addressable blocks. The preferred addressing scheme employs time encoding. Time encoding allows realignment of the audio and video information in the compressed data formatting section 117 after separate audio and video compression processing by precompression processor 115 and compressor 116.

The converted formatted information of the requested material is then preferably in the form of a series of digital data bytes which represent frames of video data and samples of the audio data. A preferred relationship of the audio and video bytes to each other is shown in FIG. 8. Incoming signals are input and converted in sequence, starting with the first and ending with the last frame of the video data, and starting with the first and ending with the last sample of the audio data. Time encoding by time encoder 114 is achieved by assigning relative time markers to the audio and video data as it passes from the converter 113 through the time encoder 114 to the precompression processor 115. Realignment of audio and video data, system addressing of particular data bytes, and user addressing of particular portions of items are all made possible through time encoding.

Through the use of the address of an item and its frame number it is possible to address any particular block of audio or video data desired. From here, further addressing down to the individual byte is possible. Frames and groups of frames may preferably be further broken down, as necessary to the individual bytes and bits, as required for certain processing within the system.

User and system addressing requirements dictate the level of granularity available to any particular section of the system. Users are able to move through data in various modes, thus moving through frame addresses at various rates. For example, a user may desire to listen to a particular song. They may preferably enter the song number either when requesting the item from the compressed data library 118 and only have that song sent to their receiving system 200 or they may preferably select that particular song from the items buffered in their receiving system 200. Internal to the system, the song is associated with a starting frame number, which was indexed by the system operator via the storage encoding process. The system item database may contain information records for individual frames or groups of frames. These can represent still frames, chapters, songs, book pages, etc. The frames are a subset of, and are contained within, the items stored in the compressed data library 118. Time encoding by time encoder 114 makes items and subsets of items retrievable and addressable throughout the transmission system 100. Time encoding enables subsequent compression of the information to be improved because data reduction processes may be performed in the time dimension. This is described in greater detail below.

The transmission system 100 of the present invention also preferably includes data compression means for compressing the formatted and sequenced data. The sequence of addressable data blocks which was time encoded and output by time encoder 114 is preferably sent to precompression processor 115. The data arriving from time encoder 114 may be at various frame rates and of various formats. Precompression processor 115

preferably includes audio precompressor **115***a* and video precompressor **115***b*.

Video precompression processor **115***b* buffers incoming video data and converts the aspects ratio and frame rate of the data, as required by compression processor **116**. The frame buffer **131** of video precompression processor **115***b* holds all incoming data until the data is compressed by the data compressor **116**. The incoming video data is processed for sample rate optimization, aspect ratio fitting and buffered in buffer **130** for compression processing by the video precompression processor **115***b*.

Video precompression processor **115***b* processes the incoming video data so that it fits into the aspects ratio of the transmission and receiving system of the present invention. When incoming material with a different aspect ratio than the aspect ratio of the system is selected, a chosen background is preferably placed around the inactive region of the video information. In this way, no data is lost to differences in the aspect ratio between incoming material, and the converted and compressed data stored in the transmission system **100**. Images resulting from a different aspect ratio may have an inactive region where background information is contained, or may be converted into a best fit arrangement. Output from the video precompression processor **115***b* is stored in the frame buffer **131**, which is dual ported and is directly addressable by video compressor **129**.

The incoming audio data is processed for sample rate and word length optimization and is then buffered in buffer **130** for compression processing by the audio precompression processor **115***a*. Audio precompression processor **115***a* may preferably transcode incoming audio information, as required, to create the optimum sample rate and word lengths for compression processing. The output of the audio precompression processor **115***a* is a constant sample rate signal of a fixed word length which is buffered in frame buffer **130**. The frame buffer **130** is dual ported and is directly addressable by audio compressor **128**. Blocking the audio data into frames at audio precompression processor **115***a* makes it possible to work with the audio data as addressable packets of information.

Once precompression processing is finished, the frames are compressed by the data compressor **116**. Compressor **116** preferably comprises an audio data compressor **128** and a video data compressor **129**. The benefits of data compression performed by data compressor **116** are shortened transmission time, faster access time, greater storage capacity, and smaller storage space requirements. Compression processing performed by compressors **128** and **129** requires multiple samples of data to perform optimum compression. Audio and video information is preferably converted into blocks of data organized in groups for compression processing by audio compressor **128** and video compressor **129**, respectively. These blocks are organized as frames, and a number of frames are contained respectively in the buffers **130** and **131**. By analyzing a series of frames it is possible to optimize the compression process.

Audio data is preferably compressed by audio compressor **128** by application of an adaptive differential pulse code modulation (ADPCM) process to the audio data. This compression process, which may be implemented by the apt-x 100 digital audio compression system, is manufactured by Audio Processing Technology (APT). Audio compression ratios of 8× or greater are achieved with the APT system.

Compression by compressor **116** may be performed on a group of 24 video frames may preferably be passed in sequence to the frame buffer **130** of the video precompression processor **115***b* where they are analyzed by video compressor **129** which performs data reduction processing on the video data. Video compression is preferably performed by video compressor **129**. Video compression is achieved by the use of processors running algorithms designed to provide the greatest amount of data compression possible. Video data compression preferably involves applying two processes: a discrete cosine transform, and motion compensation. This process is described in "A Chip Set Core of Image Compression", by Artieri and Colavin. Multiple frames of video data may preferably be analyzed for patterns in the horizontal (H), vertical (V), diagonal (zigzag) and time (Z) axis. By finding repetition in the video data, redundancy may be removed and the video data may be compressed with a minimal loss of information.

In accordance with a preferred embodiment of the present invention, the transmission system **100** may further comprise compressed data storing means, coupled to the compression means, for storing as a file the compressed sequenced data with the unique identification code received from the data compression means. After compression processing by compressor **116**, the compressed audio and video data is preferably formatted and placed into a single file by the compressed data storage means **117**. The file may contain the compressed audio and/or video data, time markers, and the program notes. The file is addressable through the unique identification code assigned to the data by the identification encoder **112**.

Further, according to the present invention, the transmission system preferably includes compressed data library means for separately storing composite formatted data blocks for each of the files. The compressed data storage means preferably includes compressed data library **118**, as shown in FIG. **2***b*. After the data is processed into a file by the compressed data storage means **117**, it is preferably stored in a compressed data library **118**. In a preferred embodiment, compressed data library **118** is a network of mass storage devices connected together via a high speed network. Access to any of the files stored in compressed data library **118** is available from multiple reception systems **200** connected to the transmission and receiving system.

Stored items are preferably accessed in compressed data library **118** through a unique address code. The unique address code is a file address for uniquely identifying the compressed data items stored in the compressed data library section of a library system. This file address, combined with the frame number, and the library system address allow for complete addressability of all items stored in one or more compressed data libraries **118**. Compressed data library addresses along with receiving system addresses are used to form a completely unique address for distribution system control.

The unique address code is an address assigned to the item by the system operator during storage encoding, which is preferably done prior to long term storage in the compressed data library **118**. In a preferred embodiment, the unique address code is used for requesting and accessing information and items throughout the trans-

mission and receiving system. The unique address code makes access to the requested data possible.

The storage encoding process performed by encoder **112** also allows entry of item notes and production credits. Production credits may include the title, names of the creators of the item such as the producer, director, actors, etc. Other details regarding the item which may be of interest and which may make the items more accessible are kept in an item database.

Item addresses are mapped to item names by identification encoder **112** and may preferably be used as an alternative method of accessing items. The item names are easier to remember, thus making user access more intuitive by using item names. The storage encoding entry process performed in identification encoder **112** operates a program which updates a master item database containing facts regarding items in the compressed data library system. The storage encoding process may be run by the system operator whereby the system operator accesses the master item database to track and describe items stored in one or more compressed data libraries. The names and other facts in the item database may preferably be updated at any time via the storage encoding process. Changes made to the master item database may be periodically sent to the remote order processing and item database **300**.

As described in more detail later, a user may preferably access an item via its unique identification code, via its title, or the user may use other known facts for accessing an item. The user may access items in the compressed data library **118** directly using the unique address code or the user may obtain access via the remote order processing and item database **300**. Indirect access via the remote order processing and item database **300** is possible using, for example, a synthesized voice system, a query type of computer program interface, or customer assistance operators. In addition to providing interactive access to the remote order processing and item database **300**, a catalog listing some or all available titles may also preferably be published. With a published catalog, users may obtain the unique address code for an item very easily thereby allowing for retrieval from the compressed data library **118** without any help from an interactive system.

To achieve user access via an interactive system, facts about the items may be kept in files as a part of the items or the facts may be kept separately, for example, by systems which only inform users of the available items and take orders. For example, in systems which have portions split in separate locations, the facts about the items may be separated from the items themselves and stored in separate files. A system of this type can distribute user orders to other portions of the transmission and receiving system for ultimate distribution to the requesting user. Further, to support a plurality of users, multiple versions of the item database may preferably reside either on multiple database servers, in catalogs, or on other computer systems.

The item database master may reside in the system control computer **1123** where may be updated and kept current to the contents of the compressed data library **118**. The data stored in the item database master may be accessed by users via application programs, running on the system control computer **1123**, and on the reception system **200** of the user. Users may connect to the item database via any available telecommunication channels. Copies of the item database master may be updated and informed of new entries into compressed data library **118** at periodic intervals determined by the system manager.

Other copies of the item database master may also be made available to users from the remote order processing and item database **300** which batch processes and downloads user requests to the control computer **1123** of the compressed data library **118** via standard telecommunications or high speed communication channels. Moreover, multiple remote order processing and item database **300** sites make it possible for more locations to process orders than there are library facilities, and thus make order processing more efficient.

Preferably, access of a requested item via the remote order processing and item database **300** operates as follows. If the user does not know the title of the desired item, he or she may request the item by naming other unique facts related to the item. For example, a user would be able to access an item about Tibetan Medicine by asking for all items which include information about "Tibet" and include information about "Medicine." The remote order processing and item database **300** would then be searched for all records matching this request. If there is more than one item with a match, each of the names of the matching items are preferably indicated to the user. The user then selects the item or items that he or she desires. Upon selection and confirmation, by the user, a request for transmission of a particular item or items is sent to the distribution manager program of the system control computer **1123**. The request contains the address of the user, the address of the item, and optionally includes specific frame numbers, and a desired viewing time of the item.

The storage encoding process performed by identification encoder **112** also allows entry of a popularity code. The popularity code is preferably assigned on the basis of how often the corresponding item is expected to be requested from the compressed data library **118**. This popularity code can be used to determine the most appropriate form of media for storage of the compressed data in a mixed media system. Mixed media systems are preferably employed as more cost effective storage in very large compressed data libraries **118**. Once assigned, the popularity code may be dynamically updated, by factoring item usage against system usage. Thus, stored items are dynamically moved to the most appropriate media over their life in the compressed data library **118**. If a particular item stored in compressed data library **118** is retrieved frequently by users, storage in compressed data library **118** is preferably on higher speed, more reliable, and probably more expensive media. Such media includes Winchester and magneto-optical disks.

If an item stored in compressed data library **118** is retrieved less frequently, it may be stored in the compressed data library **118** on a digital cassette tape. Examples of such cassette tapes are a Honeywell RSS-600 (Honeywell Inc. Minneapolis Minn.), Summus JukeBoxFilm and tape library (Summus Computer Systems, Houston, Tx. 800-255-9638), or equivalent cassette tapes. All items stored in the compressed data library **118** are on line and are connected to the high speed network. Thus, they may be readily accessed.

Instead of using a remote order processing and item database **300**, the compressed data library **118** may include the program notes which were input by the system operator. The program notes may preferably include the title of the item stored in the compressed data library **118**, chapter or song titles, running times, cred-

its, the producer of the item, acting and production credits, etc. The program notes of an item stored in the compressed data library **118** may be thus contained within the compressed data file formed in the compressed data formatter **117**.

In some cases, where multiple compressed data libraries **118** are organized, the popularity code may dictate distribution of a particular item to multiple distribution systems. In such cases, a copy of the compressed data is sent to another library and the other library can then distribute the compressed data to users concurrently with the original compressed data library **118**.

The compressed data library **118** is composed of a network of storage devices connected through a High Performance Parallel Interface (HPPI) Super Controller (available from Maximum Strategy Inc., San Jose, Ca.). Therefore, multiple communication controllers may preferably access the large quantity of data stored in compressed data library **118** at very high speeds for transfer to a reception system **200** of a user upon request. For more details on this configuration see Ohrenstein, "Supercomputers Seek High Throughput and Expandable Storage", Computer Technology Review, pp. 33–39 April 1990.

The use of an HPPI controller allows file placement onto multiple mass storage devices of the compressed data library **118** with a minimum of overhead. Data-based management software controls the location and tracking of the compressed data library **118** which can be located across multiple clusters of file servers connected together by one or more high speed networks over multiple systems.

The transmission system **100** of the present invention may also preferably include library access/interface means for receiving transmission requests to transmit items and for retrieving formatted data blocks stored in the compressed data library **118** corresponding to the requests from users. The compressed audio and/or video data blocks, along with any of the information about the item stored in the compressed data library **118** may be accessed via library access interface **121**. The library access interface **121** receives transmission requests either directly from the users or indirectly by remote order processing and item database **300**. The transmission format means **119** receives the request and retrieves the composite formatted data block of the requested item stored in compressed data library **118** and converts the compressed formatted data block into a format suitable for transmission. The requested item is then sent to the user via the transmitter **122** or directly via interface **121**.

In a preferred embodiment of the present invention, customer access of an item stored in compressed data library **118** via the library access interface **121** may be performed in various ways. The methods of requesting a stored item are analogous to making an airline reservation or transferring funds between bank accounts. Just as there are different methods available for these processes it is desirable to have several ordering methods available to the users of the system of the present invention. For example, telephone tone decoders and voice response hardware may be employed. Additionally, operator assisted service or user terminal interfaces may be used.

Customer access via telephone tone decoders and voice response hardware is completely electronic and may preferably be performed between a system user and a computer order entry system. The user may obtain help in ordering an item from a computer synthesized voice. With such an access method, the user will normally be accessing a dynamic catalog to assist them. Confirmation of selections and pricing information may preferably be given to the user prior to completion of the transaction.

This process of access, performed by remote order processing and item database configuration **300**, shown in FIG. **1***c*, preferably includes the following steps, shown in flowchart **3000** of FIG. **3**. First, the user calls the system access number (step **3010**). Upon successfully dialing the system access number, the user receives instructions from the system (step **3020**). The instructions may preferably include steps the user must take in order to place an order. Preferably, the instructions may be bypassed by the experienced user who knows how to place an order.

The user then enters a customer ID code by which the system accesses the user's account, and indicates to the system that the user is a subscriber of the system (step **3030**). In response to the user entering his ID code in step **3030** the system confirms whether the user is in good standing (step **0340**). If the user is in good standing, the system queues the user to input his request (step **3050**).

The user request may preferably be made from a catalog sent to each of the subscribers of the system. The user will preferably identify his choice and enter the corresponding identification code of the item (step **3060**). The system then preferably confirms the selection that the user has made and informs the user of the price of the selection (step **3070**).

The user then indicates whether the confirmation preformed in step **3070** is correct (step **3080**). If the confirmation performed in step **3070** is correct, the user so indicates and then inputs a desired delivery time and delivery location (step **3090**).

If the confirmation performed in step **3070** does not result in the selection desired by the user, the user reinputs the item identification code in step **3060** and the confirmation steps **3070** and **3080** are repeated. Therefore, proper selection of the selected item is insured. Once there is confirmation, the user enters the playback time and destination in step **3090**.

The user then preferably confirms that the order is correct (step **3100**). The confirmation performed in step **3100** includes confirmation of the entire transaction including the selected item, the selected time of playback, and the location of playback. The transaction is then completed and the request is placed on a transmission queue at the appropriate compressed data library **118** (step **3110**).

Access by the user via operator assisted service includes telephone operators who answer calls from the users. The operators can sign up new customers, take orders, and help with any billing problems. The operator will preferably have computer terminals which give them access to account information and available program information. Operators can also assist a user who does not know a title by looking up information stored in files which may contain the program notes, as described above. Once the chosen program is identified, the operator informs the user of the price. After the user confirms the order, the user indicates the desired delivery time and destination. The operator then enters the user request into the system. The request is placed in the transmission queue.

Access by a user terminal interface method provides the user with access from various terminals including personal computers, and specialized interfaces built into the reception system **200** for the user. Such access allows a user to do a search of available programs from a computer screen. This process involves the steps **4000** shown in FIG. **4**.

FIG. **4** is a flowchart of a preferred method of user request via a user interface of the present invention. In the preferred method of FIG. **4**, the user first logs onto the user terminal interface (step **4010**). After the user logs on, the user may preferably select a desired item by searching the database of available titles in the library system control computer **1123** or any remote order processing and item database **300** (step **4020**). The search may preferably be performed using the database containing the program notes, described above with respect to FIGS. *2a* and *2b*. It is possible to process orders and operate a database of available titles at multiple locations remote of the source material library **111**. Users and orders processing operators may preferably access such remote system and may place transmission requests from these systems. Orders placed on these systems will be processed and distributed to the appropriate libraries. After the desired item is found, the user selects the item for transmission at a specific time and location (step **4030**).

To complete an order, the remote order processing and item database **300** preferably connects to the compressed data library **118** of choice via the library access interface **121** and communicates with the library system control computer **1123**. Preferably the user's account ID, identification of the item for transmission and the chosen destination for the item are communicated. Through employment of distributed order processing systems of this type many orders may be processed with minimal library overhead.

All transmission requests from the access methods are placed into a transmission queue managed by the library system control computer **1123**. This queue is managed by a program that controls the distribution of the requested item to the reception system **200** of the user. The queue manager program also operates in the system control computer and keeps track of the user ID, the chosen program and price, the user channel type, the number of requests for a given program, the latest delivery time, and the compressed data library media type (for example, high speed or low speed). From this information, the queue manager program makes best use of the available distribution channels and media for efficient transmission and storage of the requested items.

The queue manager program also managers the file transmission process for multiple requests for a single file, stored in the compressed data library **118**. During a given time period, the queue manager program will optimize access to the compressed data library **118**, wherever possible it will place the data on multiple outputs for simultaneous transmission to more than one requesting user.

The conversion performed by transmission data converter **119** encodes the data for the transmission channel. The transmission data converter transfers the desired segment of data from the compressed data library **118** onto the communication channel which is used to deliver the data to the reception system **200**.

The transmission system **100** of the present invention preferably further includes transmitter means **122**, coupled to the compressed data library **118**, for sending at least a portion of a specific file to at least one remote location. The transmission and receiving system of the present invention preferably operates with any available communication channels. Each channel type is accessed through the use of a communications adaptor board or processor connecting the data processed in the transmission format converter **119** to the transmission channel.

A preferred embodiment of the present invention also includes means by which to access users via common access lines. These may include standard telephone, ISDN or B-ISDN, microwave, DBS, cable television systems, MAN, high speed modems, or communication couplers. Metropolitan Area Network (MANs) which are common carrier or private communication channels are designed to link sites in a region. MANs are described by Morreale and Campbell in "Metropolitan-area networks" (IEEE Spectrum, May 1990 pp. 40–42). The communication lines are used to transmit the compressed data at rates up to, typically, 10 Mb/sec.

In order to serve a multitude of channel types, a preferred embodiment of the present invention includes a multitude of output ports of each type connected to one or more computers on the transmission and receiving system. The management of transmission is then distributed. That is, the computer controlling the transmission queue tells the transmission encoding computer its task and then the task is executed by the transmission encoding computer, independent of the transmission queue computer. The transmission queue computer provides the data for transmission by the file server which also distributes to other transmitters located in the same or other transmission encoding computers.

FIG. **5** is a flowchart of a preferred method of implementing a queue manager program of the present invention. The queue manager program, in the distribution process, preferably confirms availability of an item from the compressed data library **118** and logically connects the item stored in compressed data library **118** to the communications controller, illustrated in FIG. *2a* (step **5010**). After availability is confirmed in step **5010**, the data awaits transmission by the transmitter **122**.

After availability is confirmed in step **5010**, the communications controller preferably makes the physical connection to the reception system **200** of the user (step **5020**). This is normally done by dialing the receiving device of the user. The reception system **200** preferably answers the incoming call and confirms the connection (step **5030**).

Once connected to the reception system **200**, in steps **5020** and **5030**, the data stored in compressed data library **118** is preferably transferred in data blocks from the compressed data library **118** to the communications controller (step **5040**). The data blocks are buffered by the communications controller. The buffered data is sent down the communications channel to the reception system **200** by transmitter **122** (step **5050**).

The transmitter **122** places the formatted data onto the communications channel. This is an electrical conversion section and the output depends upon the chosen communication path. The signal is sent to the reception system **200** in either a two way or a one way communication process. In a standard telephone connection, the transmitter **122** is preferably a modem. When using an ISDN channel, the transmitter **122** is preferably a data coupler.

In a preferred embodiment of the present invention, many forms of communication channels may be em-

ployed. Distribution of information is by common carrier communication channels whenever possible. These channels include common telephone service, ISDN and Broadband ISDN, DBS, cable television systems, microwave, and MAN.

In order that reception is performed efficiently, the reception system **200** confirms reception of the initial data block before receiving the remaining data blocks whenever possible (step **5060**). After all data blocks have been received and reception is confirmed, the communications controller breaks the physical connection to the reception system **200** (step **5070**). Then, confirmation of the transmission is sent to the queue manager (step **5080**). Finally, the queue manager updates the list and sends the information to the billing program, which updates the account of the user (step **5090**).

When item distribution occurs through a broadcasting method such as a communications satellite, the process is one way, with ongoing reception not being confirmed by the reception system **200**. In these situations, some further redundancy is included by transmission formatter **122** with the data blocks for error correction processing to be performed in the reception system **200**. In such one way communication situations, the queue manager program running in library system control computer **1123** confirms reception, via telephone line connection for example, to the reception system **200** after distribution. This should occur prior to updating the user's account and the dispatch lists.

The real time output signals are output to a playback system such as an audio amplifier and/or television. This output may also be sent to an audio/video recorder for more permanent storage. Moreover, in the preferred embodiment only non-copy protected data can be recorded on an audio/video recorder. Any material which is copy protected will be scrambled at the video output in a way which makes it viewable on a standard audio/video receiver but does not allow for recording of the material.

The reception system **200** has playback controls similar to the controls available on a standard audio/video recorder. These include: play, fast forward, rewind, stop, pause, and play slow. Since items are preferably stored on random access media, the fast forward and rewinding functions are simulations of the actual events which occur on a standard audio/video recorder. Frames do not tear as on an audio/video recorder, but in fast play modes they go by very quickly.

The library access interface **121** in the reception system **200** preferably includes a title window where a list of available titles are alphabetically listed. This window has two modes: local listing of material contained within the library system control computer **1123**, and library listing for all available titles which may be received from the available, remotely accessible libraries. The titles listed in this window are sent from the database on the library system control computer **1123** or the remote order processing and item database **300**.

The system may also preferably include dispatching control software which receives input from the remote order processing and item database **300** and sends distribution requests to the distribution systems. In instances where not all items are contained in each of the compressed data libraries **118**, the dispatching software will keep a list of the available titles in a particular compressed data library **118**. The dispatch software may also preferably coordinate network traffic, source material library **111** utilization, source material library **111** contents, and connection costs. By proper factoring of these variables, efficient use of the available distribution channels may be achieved.

FIG. **6** illustrates a block diagram of a preferred implementation of the reception system **200** according to the present invention. The reception system **200** is responsive to user requests for information stored in source material library **111**. the reception system **200** includes transceiver **201** which receives the audio and/or video information transmitted by transmitter **122** of the transmission system **100**. The transceiver **201** automatically receives the information from the transmitter **122** as compressed formatted data blocks.

The transceiver **201** is preferably connected to receiver format converter **202**. The receiver format converter **202** converts the compressed formatted data blocks into a format suitable for playback by the user in real time.

In the reception system **200** of the present invention, the user may want to play back the requested item from the source material library **111** at a time later than when initially requested. If that is the case, the compressed formatted data blocks from receiver format converter **202** are stored in storage **203**. Storage **203** allows for temporary storage of the requested item until playback is requested.

When playback is requested, the compressed formatted data blocks are sent to data formatter **204**. Data formatter **204** processes the compressed formatted data blocks and distinguishes audio information from video information.

The separated audio and video information are respectively decompressed by audio decompressor **209** and video decompressor **208**. The decompressed video data is then sent simultaneously to converter **206** including digital video output converter **211** and analog video output converter **213**. The decompressed audio data is sent simultaneously to digital audio output converter **212** and analog audio output converter **214**. The outputs from converters **211-214** are produced in real time.

The real time output signals are output to a playback system such as a TV or audio amplifier. They may also be sent to an audio/video recorder of the user. By using the reception system **200** of the present invention, the user may utilize the stop, pause, and multiple viewing functions of the receiving device. Moreover, in a preferred embodiment of the present invention, the output format converters may be connected to a recorder which enables the user to record the requested item for further multiple playbacks.

FIG. **7** is a flow chart **400** of a preferred method of distribution of the present invention. The distribution method is preferably responsive to requests identifying information to be sent from the transmission system **100** to remote locations. Method **400** assumes that the items have already been stored in compressed data library **118**.

As illustrated in FIG. **7**, the first step of the distribution method **400** involves retrieving the information for selected items in the source material library **111**, upon a request by a user of the distribution system (step **412**). This is analogous to taking books off of a shelf at the local public library after the person has decided that he or she would like to read them.

After the information for the selected items is retrieved in step **412**, the distribution method **400** of the present invention further comprises the step of processing the information for efficient transfer (step **413**). The

processing performed in step **413** preferably includes assigning a unique identification code to the retrieved information performed by identification encoder **112**, shown and described with respect to FIG. **2***a* (step **413***a*). The processing also preferably includes placing the retrieved information into a predetermined format as formatted data by converter **113** (step **413***b*), and placing the formatted data into a sequence of addressable data blocks by ordering means **114** (step **413***c*).

Processing step **413** also includes compressing the formatted and sequenced data performed by data compressor **116** (step **413***d*), and storing as a file the compressed sequenced data received from the data compression means with the unique identification assigned by the identification encoding means (step **413***e*).

After the information is processed for efficient transfer, in substeps **413***a–e* of step **413**, the distribution method **400** of the present invention preferably includes the step of storing the processed information is stored in a compressed data library (step **414**). Preferably, the compressed data library is analogous to compressed data library **118**, described with respect to FIG. **2***a*.

After the information is stored in a compressed data library **118**, the transmission and receiving system preferably waits to receive a transmission request (step **415**). Upon receiving a transmission request, from transmission system **100**, the compressed formatted data is preferably converted for output to a reception system **200**, selected by the user. The information is preferably transmitted over an existing communication channel to a reception system **200**, and is received by that system (step **417**). When the information is received in step **417**, it is perferably formatted for the particular type of reception system **200** to which the information is sent.

The received information is preferably buffered (step **418**) by a storage means analogous to element **203** shown in FIG. **3**. The information is preferably buffered so that it may be stored by the user for possible future viewings. The requested information is then played back to the reception system **200** of the user at the time requested by the user (step **419**).

FIGS. **8***a–8e* are block diagrams of preferred implementations of data structures and data blocking for items in the audio and video distribution system. FIG. **8***a* shows the block structure of video data where a video frame **812** is composed of a plurality of video samles **811**, and a second of video **813** is composed of a plurality of video frames **812**.

FIG. **8***b* shows the block structure of audio data where an audio data frame **822** is composed of a plurality of audio samples **821**, and a second of audio **823** is composed of a plurality of audio data frames **822**. FIG. **8***c* shows the block structure of a data frame **832** composed of a plurality of data bytes **831**. The combination of the audio frames **812**, video frames **822**, and data frames **832** comprise the elements of a single item. FIG. **8***d* shows a block representation of for three illustrative items which may be stored in the source material library **111**. Each of items **1–3** contains its own arrangement of video frames **812**, audio frames **822**, and data frames **832**.

FIG. **8***e* shows methods of distribution to reception systems **200** with both multiplexed and non-multiplexed signal paths, both addressed and non-addressed blocks of items. A block of an item may be an entire item or, alternatively, may be only a portion of an item, as selected by a user. Further, the blocks may be composed of either compressed, as required by the configuration of the decompressed data, as required by the configuration of the reception system **200**.

As shown in FIG. **8***e*, the same block, for example, block **1**, may be simultaneously transmitted over different distribution channels. The blocks when transmitted over one of the distribution channels may have receiver addresses appended to the blocks or the reception system **200** may have been preconfigured to receive the blocks comprising data frames for particular items from the active distribution channel.

Other embodiments of the invention will be apparent to those skilled in the art from consideration of the specification and practice of the invention disclosed herein. It is intended that the specification and examples be considered as exemplary only, with the true scope and spirit of the invention being indicated by the following claims.

What is claimed is:

1. A transmission system for providing information to be transmitted to remote locations, the transmission system comprising:

library means for storing items containing information;

identification encoding means for retrieving the information in the items from the library means and for assigning a unique identification code to the retrieved information;

conversion means, coupled to the identification encoding means, for placing the retrieved information into a predetermined format as formatted data;

ordering means, coupled to the conversion means, for placing the formatted data into a sequence of addressable data blocks;

compression means, coupled to the ordering means, for compressing the formatted and sequenced data blocks;

compressed data storing means, coupled to the data compression means, for storing as files the compressed, sequenced data blocks received from the data compression means with the unique identification code assigned by the identification encoding means; and

transmitter means, coupled to the compressed data storing means, for sending at least a portion of one of the files to a reception system at a head end of a cable television system for subsequent transmission to one of the remote locations.

2. A distribution method responsive to requests from a user identifying items in a transmission system containing information to be sent from the transmission system to receiving systems at remote locations, the method comprising the steps of:

storing, in the transmission system, information from items in a compressed data form, the information including an identification code and being placed into ordered data blocks;

sending a request, by the user to the transmission system, for at least a part of the stored information to be transmitted to a reception system associated with a receiving system at one of the remote locations selected by the user;

sending at least a portion of the stored information from the transmission system to the reception system;

receiving the sent information by the reception system;

storing a complete copy of the received information in the reception system; and

playing back the stored copy of the information from the reception system to the receiving system at the selected remote location at a time requested by the user.

3. A receiving system responsive to a user input identifying a choice of an item stored in a source material library at a transmission system to be played back to a user at a location remote from the source material library, the item containing information to be sent from the transmission system to the receiving system, the receiving system comprising:

requesting means for transmitting to the source material library in the transmission system the identity of the item;

transceiver means, coupled to the requesting means, for receiving the item from the transmission system as at least one compressed, formatted data block;

receiver format conversion means, coupled to the transceiver means, for converting the at least one compressed, formatted data block into a format suitable for storage processing, and for playback at the receiver system;

storage means, coupled to the receiver format conversion means, for storing a complete copy of the formatted data;

decompressing means, coupled to the receiver format conversion means, and located at a head end of a cable television system, for decompressing the copy of the formatted data; and

output data conversion means, coupled to the decompressing means, for playing back the decompressed copy of the data at a time specified by the user and at a user receiver.

4. A transmission system for providing information to be transmitted to remote locations, the transmission system comprising:

library means for storing items containing information;

identification encoding means for retrieving the information in the items from the library means and for assigning a unique identification code to the retrieved information;

conversion means, coupled to the identification encoding means, for placing the retrieved information into a predetermined format as formatted data;

ordering means, coupled to the conversion means, for placing the formatted data into a sequence of addressable data blocks;

compression means, coupled to the ordering means, for compressing the formatted and sequenced data blocks;

compressed data storing means, coupled to the data compression means, for storing as files the compressed, sequenced data blocks received from the data compression means with the unique identification code assigned by the identification encoding means; and

transmitter means, coupled to the compressed data storing means, for sending at least a portion of one of the files to a reception system at a head end of a cable television system over an optical fiber communication path for subsequent transmission over a cable communication path to one of the remote locations.

5. A distribution method responsive to requests from a user identifying items in a transmission system containing information to be sent from the transmission system to receiving systems at remote locations, the method comprising the steps of:

storing, in the transmission system, information from items in a compressed data form, the information including an identification code and being placed into ordered data blocks;

sending a request, by the user to the transmission system, for at least a part of the stored information to be transmitted to a reception system associated with a receiving system at one of the remote locations selected by the user;

sending at least a portion of the stored information from the transmission system to the reception system over an optical fiber communication path;

receiving the sent information by the reception system;

storing a complete copy of the received information in the reception system; and

playing back the stored copy of the information sent over a cable communication path from the reception system to the receiving system at the selected remote location at a time requested by the user.

6. A receiving system responsive to a user input identifying a choice of an item stored in a source material library at a transmission system to be played back to a user at a location remote from the source material library, the item containing information to be sent from the transmission system to the receiving system, the receiving system comprising:

requesting means for transmitting to the source material library in the transmission system the identity of the item;

transceiver means, coupled to the requesting means, for receiving the item over an optical fiber communication path from the transmission system as at least one compressed, formatted data block;

receiver format conversion means, coupled to the transceiver means, for converting the at least one compressed, formatted data block into a format suitable for storage processing, and for playback at the receiver system;

storage means, coupled to the receiver format conversion means, for storing a complete copy of the formatted data;

decompressing means, coupled to the receiver format conversion means, and located at a head end of a cable television system, for decompressing the copy of the formatted data; and

output data conversion means, coupled to the decompressing means, for playing back the decompressed copy of the data, received over a cable communication path, at a time specified by the user and at a user receiver.

7. A transmission system for providing information to be transmitted to remote locations, the transmission system comprising:

library means for storing items containing information;

identification encoding means for retrieving the information in the items from the library means and for assigning a unique identification code to the retrieved information;

conversion means, coupled to the identification encoding means, for placing the retrieved information into a predetermined format as formatted data;

ordering means, coupled to the conversion means, for placing the formatted data into a sequence of addressable data blocks;

compression means, coupled to the ordering means, for compressing the formatted and sequenced data blocks;

compressed data storing means, coupled to the data compression means, for storing as files the compressed, sequenced data blocks received from the data compression means with the unique identification code assigned by the identification encoding means; and

transmitter means, coupled to the compressed data storing means, for sending at least a portion of one of the files via an optical fiber communication path to one of the remote locations.

* * * * *

EXHIBIT

9

US005132992A

United States Patent [19]

Yurt et al.

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[54] AUDIO AND VIDEO TRANSMISSION AND RECEIVING SYSTEM

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[22] Filed: Jan. 7, 1991

[51] Int. Cl.[5] H04N 1/00

[52] U.S. Cl. 375/122; 358/86; 455/5.1

[58] Field of Search 375/122; 358/335, 133, 358/86, 84, 102, 903; 360/8, 9.1, 14.1; 455/3, 4, 5, 2

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Primary Examiner—Stephen Chin

Attorney, Agent, or Firm—Finnegan, Henderson, Farabow, Garrett & Dunner

[57] ABSTRACT

A system of distributing video and/or audio information employs digital signal processing to achieve high rates of data compression. The compressed and encoded audio and/or video information is sent over standard telephone, cable or satellite broadcast channels to a receiver specified by a subscriber of the service, preferably in less than real time, for later playback and optional recording on standard audio and/or video tape.

58 Claims, 12 Drawing Sheets

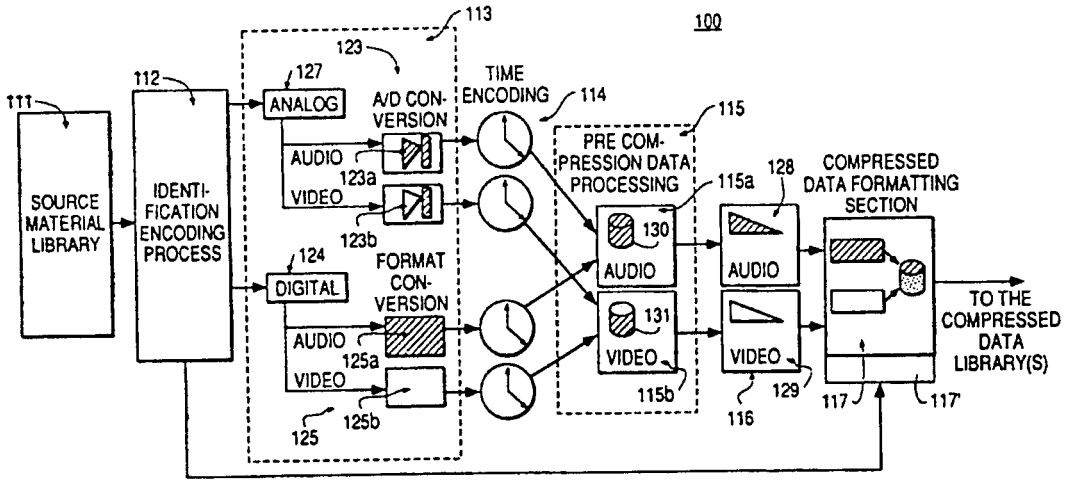


FIG. 1a

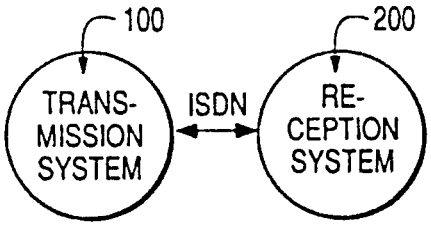


FIG. 1b

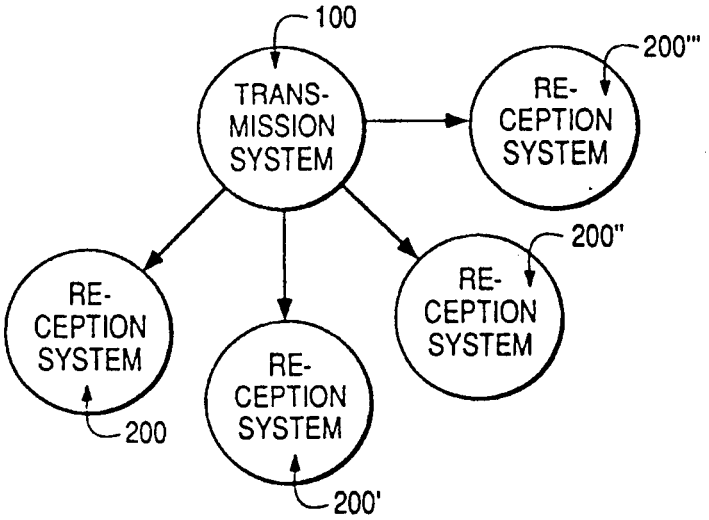
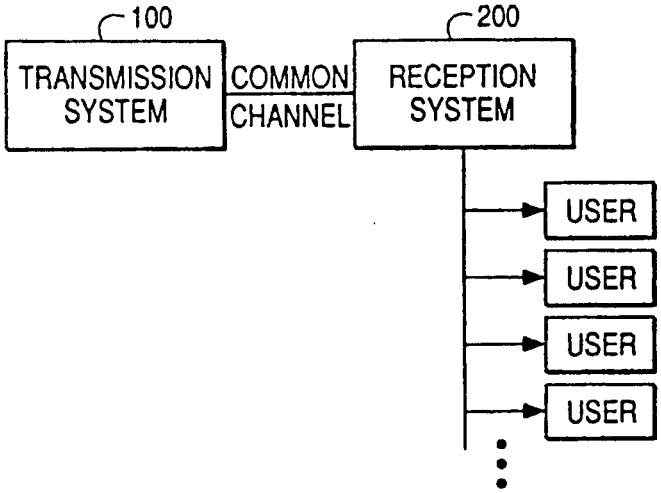


FIG. 1d



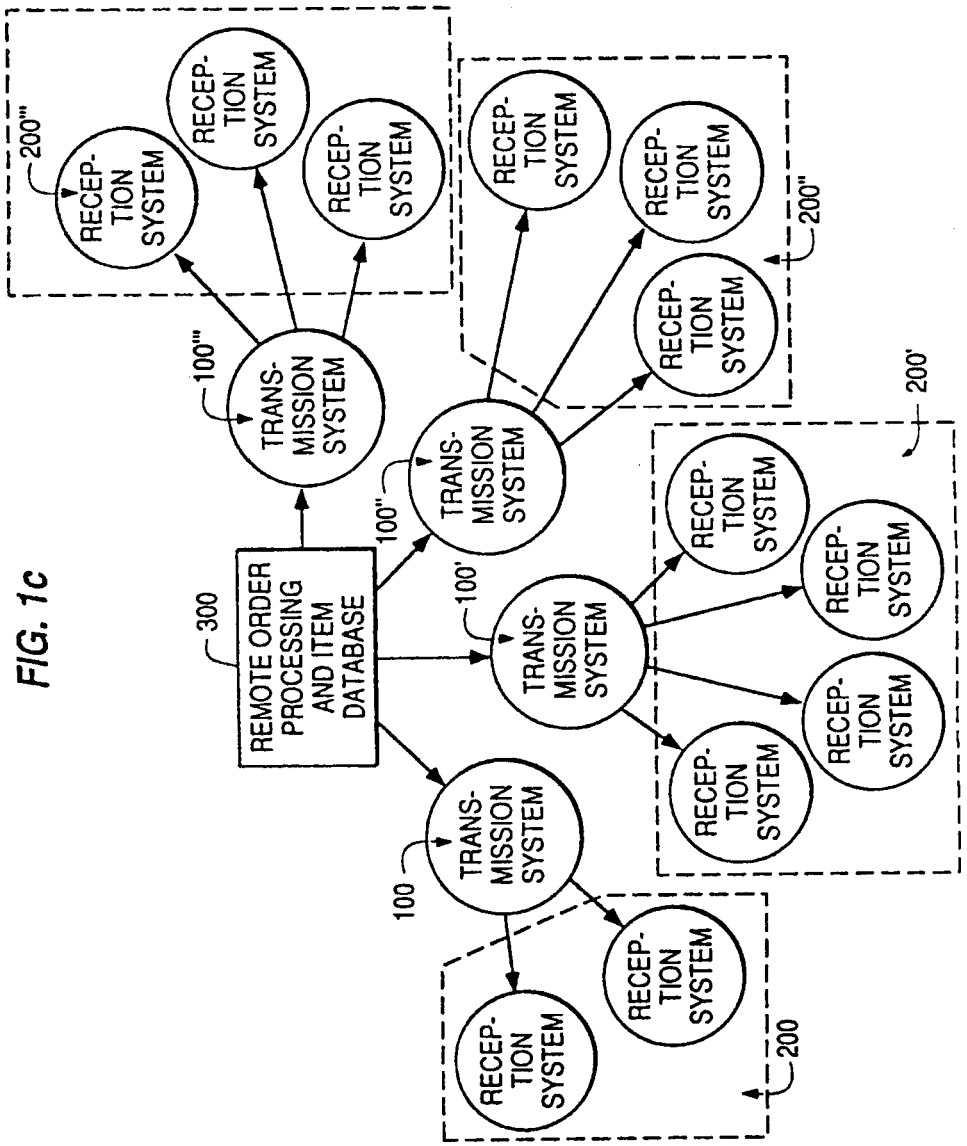

REMOTE ORDER PROCESSING AND ITEM DATABASE
300
TRANS-MISSION SYSTEM
100
100'
100"
100'''
RECEP-TION SYSTEM
200
200'
200"
200'''

FIG. 1c

FIG. 1e

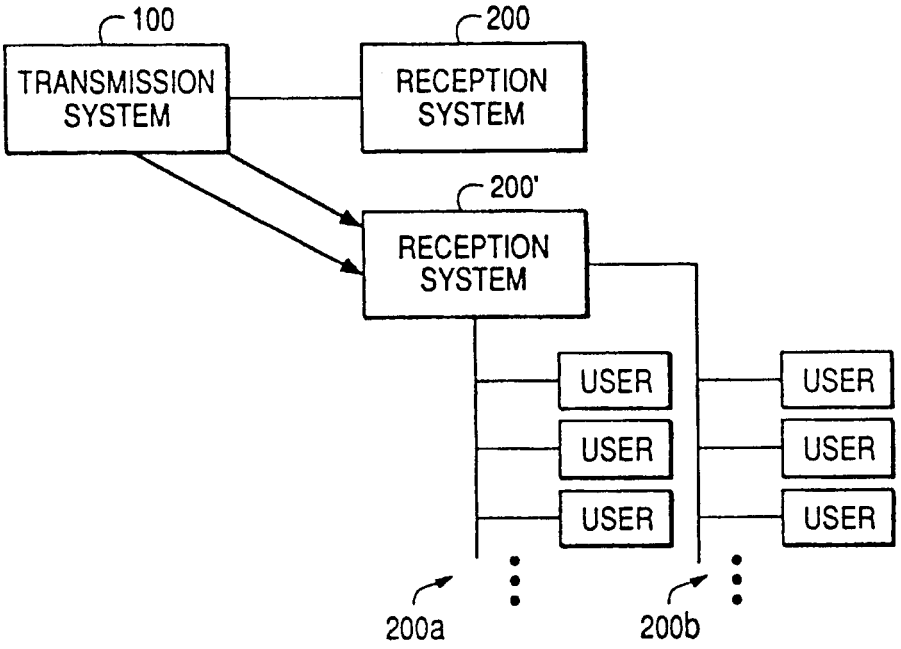

100
TRANSMISSION SYSTEM
200
RECEPTION SYSTEM
200'
RECEPTION SYSTEM
USER
USER
USER
USER
USER
USER
200a
200b

FIG. 1f

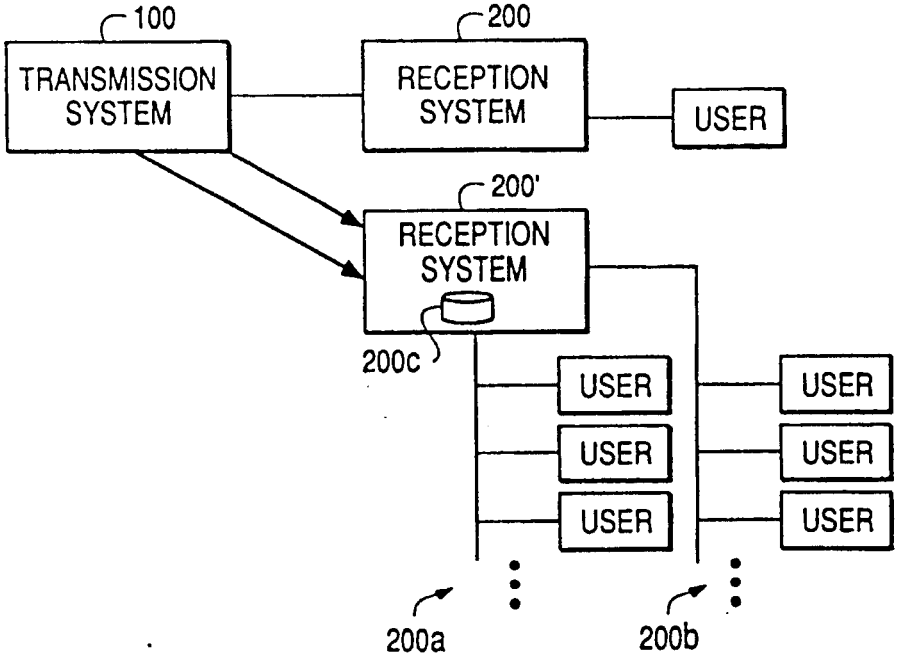

100
TRANSMISSION SYSTEM
200
RECEPTION SYSTEM
USER
200'
RECEPTION SYSTEM
200c
USER
USER
USER
USER
USER
USER
200a
200b

FIG. 1g

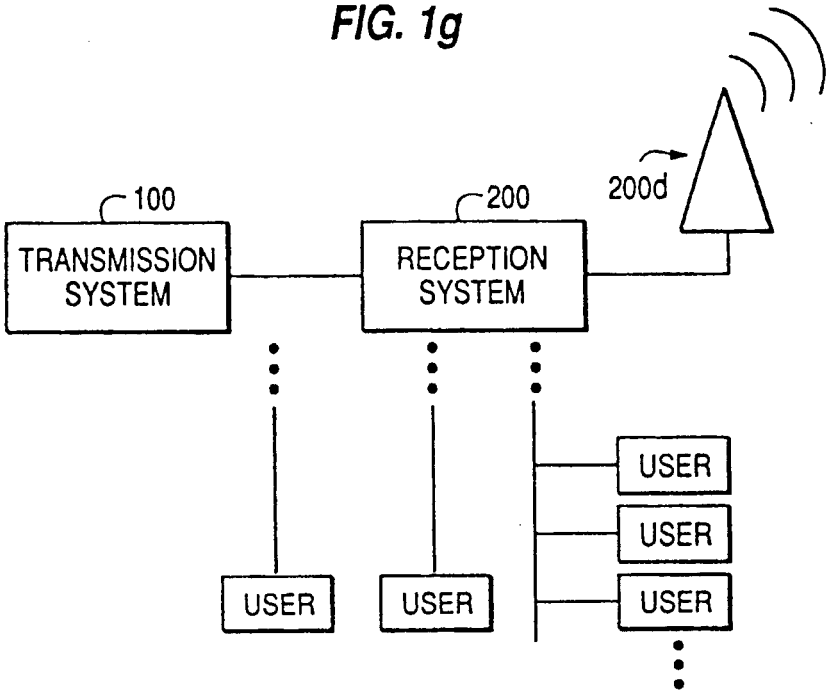
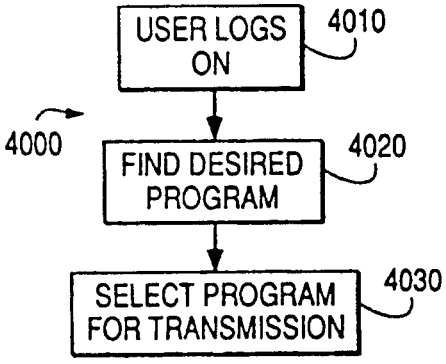

100
TRANSMISSION SYSTEM
200
RECEPTION SYSTEM
200d
USER
USER
USER
USER
USER

FIG. 4


USER LOGS ON
4010
4000
FIND DESIRED PROGRAM
4020
SELECT PROGRAM FOR TRANSMISSION
4030

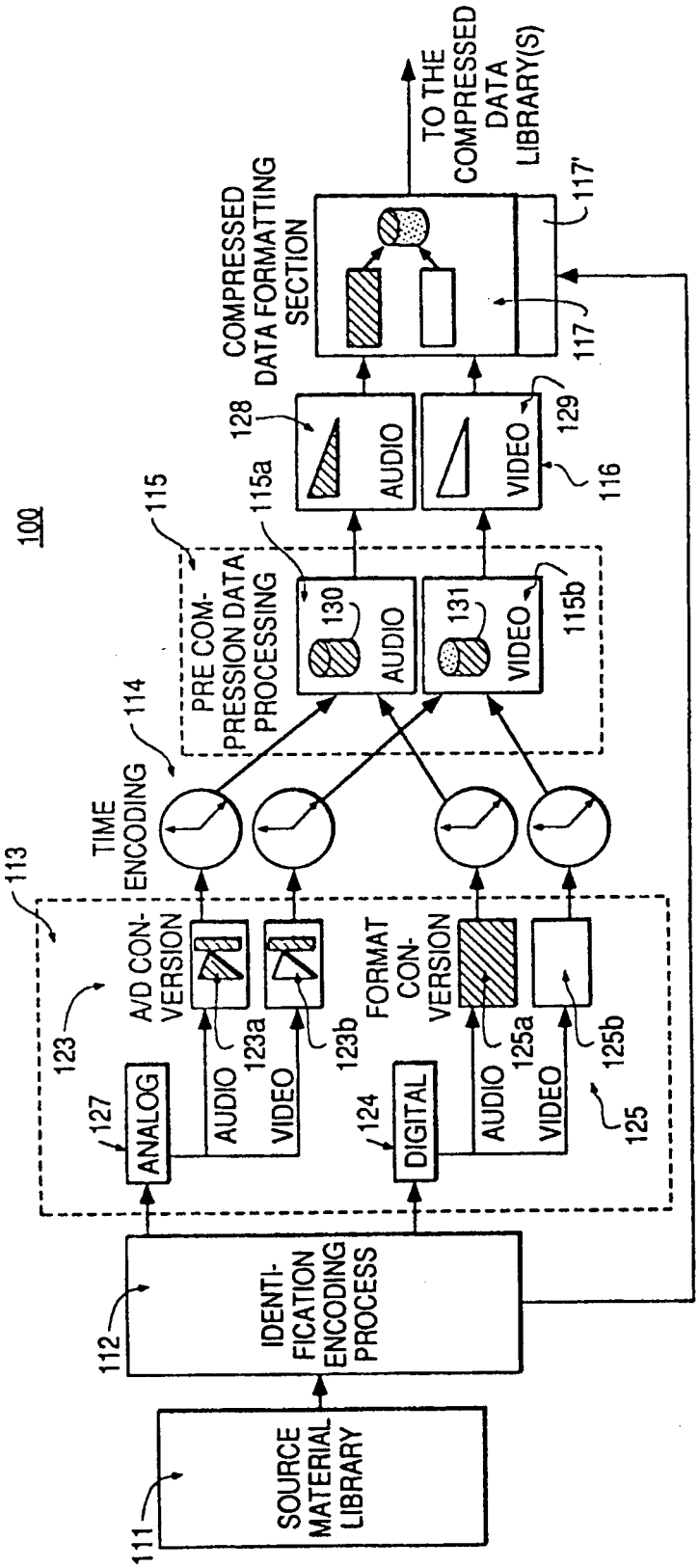

100
111
SOURCE MATERIAL LIBRARY
112
IDENTI-FICATION ENCODING PROCESS
113
123
127
ANALOG
A/D CON-VERSION
AUDIO
123a
VIDEO
123b
124
DIGITAL
FORMAT CON-VERSION
AUDIO
125a
VIDEO
125b
125
TIME ENCODING
114
PRE COM-PRESSION DATA PROCESSING
115
115a
130
AUDIO
131
VIDEO
115b
128
AUDIO
129
VIDEO
116
COMPRESSED DATA FORMATTING SECTION
117
117'
TO THE COMPRESSED DATA LIBRARY(S)

FIG. 2a

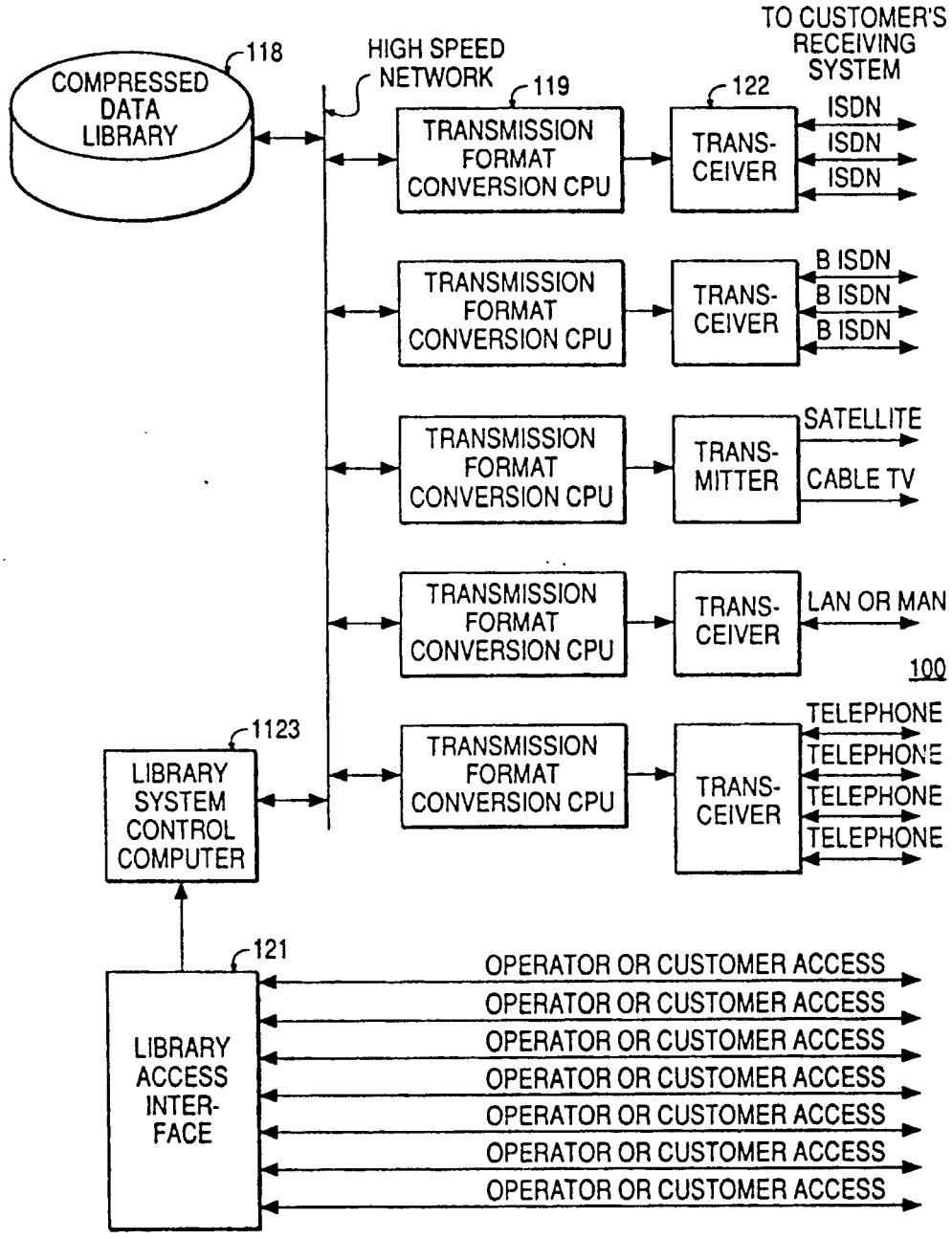

COMPRESSED DATA LIBRARY
118
HIGH SPEED NETWORK
119
TRANSMISSION FORMAT CONVERSION CPU
122
TRANS-CEIVER
TO CUSTOMER'S RECEIVING SYSTEM
ISDN
ISDN
ISDN
TRANSMISSION FORMAT CONVERSION CPU
TRANS-CEIVER
B ISDN
B ISDN
B ISDN
TRANSMISSION FORMAT CONVERSION CPU
TRANS-MITTER
SATELLITE
CABLE TV
TRANSMISSION FORMAT CONVERSION CPU
TRANS-CEIVER
LAN OR MAN
100
1123
LIBRARY SYSTEM CONTROL COMPUTER
TRANSMISSION FORMAT CONVERSION CPU
TRANS-CEIVER
TELEPHONE
TELEPHONE
TELEPHONE
TELEPHONE
121
LIBRARY ACCESS INTER-FACE
OPERATOR OR CUSTOMER ACCESS
OPERATOR OR CUSTOMER ACCESS
OPERATOR OR CUSTOMER ACCESS
OPERATOR OR CUSTOMER ACCESS
OPERATOR OR CUSTOMER ACCESS
OPERATOR OR CUSTOMER ACCESS
OPERATOR OR CUSTOMER ACCESS

FIG. 2b

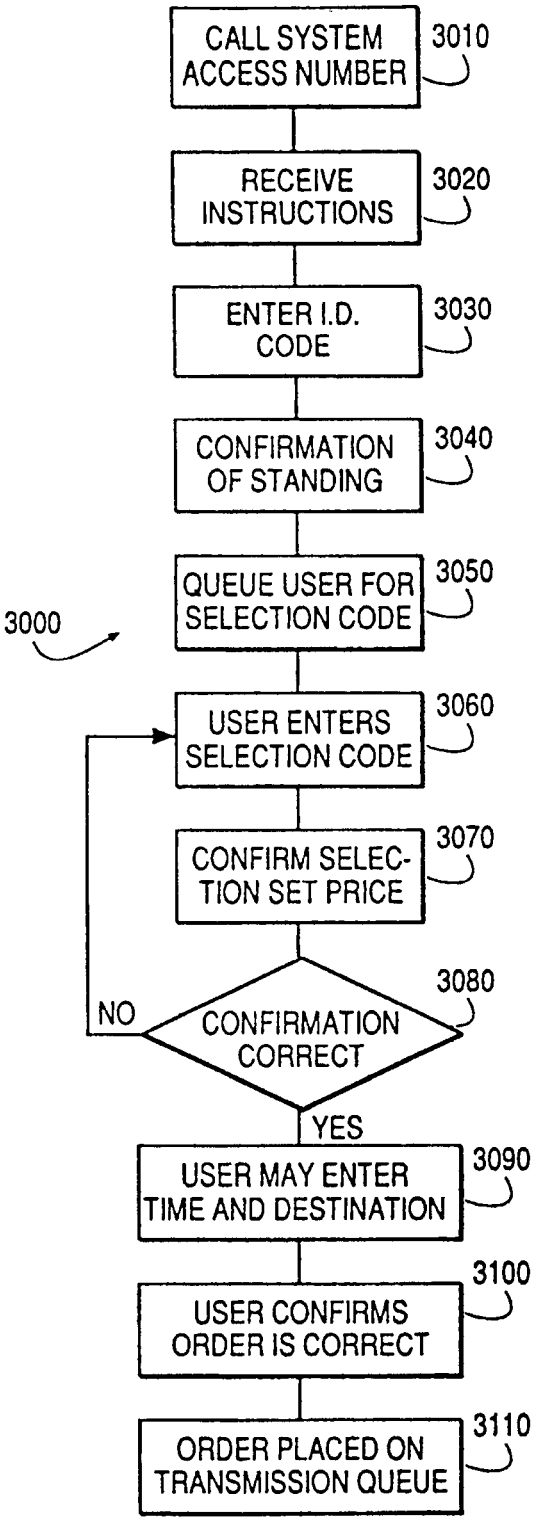

CALL SYSTEM ACCESS NUMBER
3010
RECEIVE INSTRUCTIONS
3020
ENTER I.D. CODE
3030
CONFIRMATION OF STANDING
3040
QUEUE USER FOR SELECTION CODE
3050
3000
USER ENTERS SELECTION CODE
3060
CONFIRM SELECTION SET PRICE
3070
CONFIRMATION CORRECT
3080
NO
YES
USER MAY ENTER TIME AND DESTINATION
3090
USER CONFIRMS ORDER IS CORRECT
3100
ORDER PLACED ON TRANSMISSION QUEUE
3110

FIG. 3

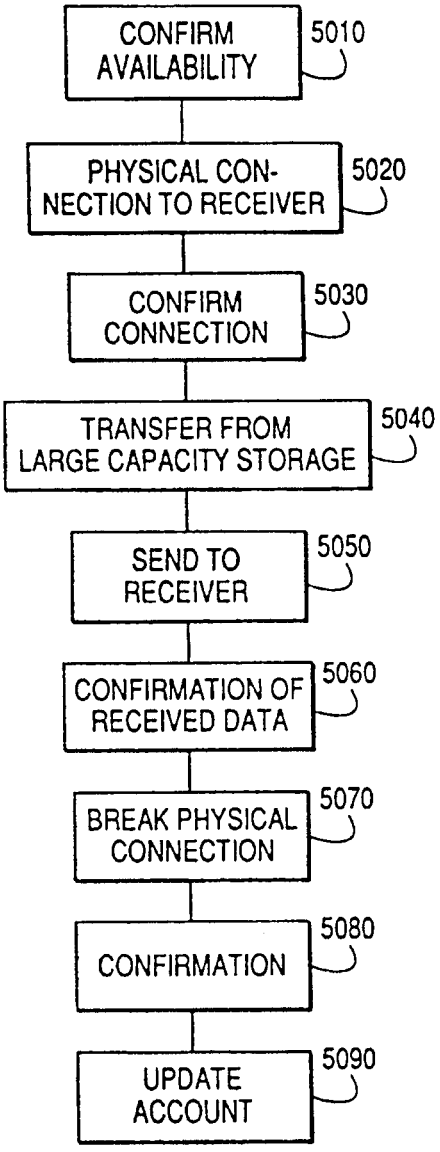

CONFIRM AVAILABILITY
5010
PHYSICAL CONNECTION TO RECEIVER
5020
CONFIRM CONNECTION
5030
TRANSFER FROM LARGE CAPACITY STORAGE
5040
SEND TO RECEIVER
5050
CONFIRMATION OF RECEIVED DATA
5060
BREAK PHYSICAL CONNECTION
5070
CONFIRMATION
5080
UPDATE ACCOUNT
5090

FIG. 5

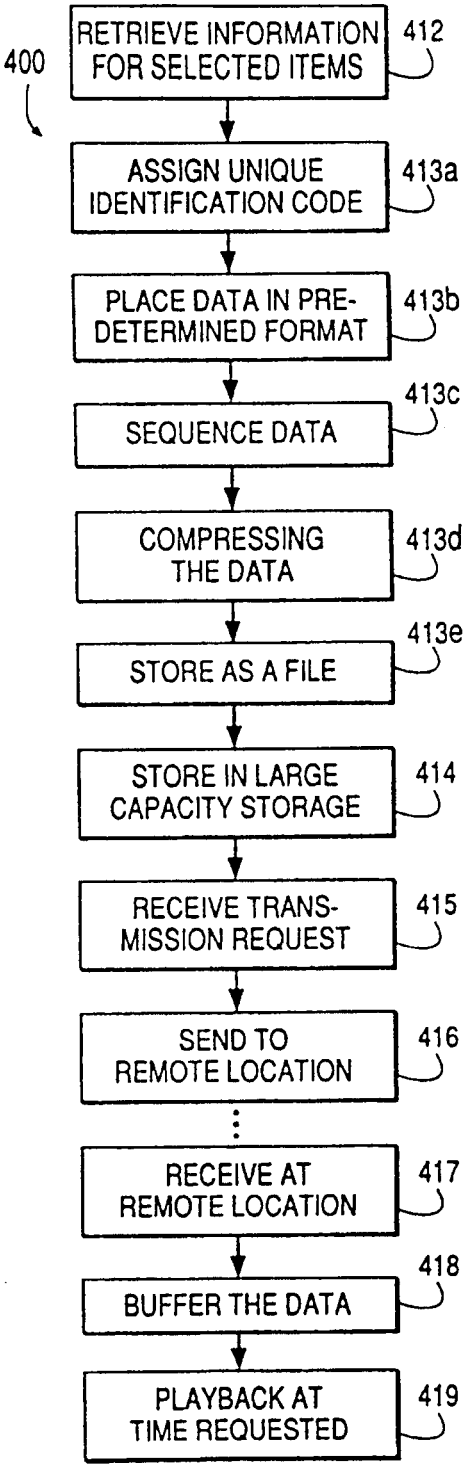

400
RETRIEVE INFORMATION FOR SELECTED ITEMS
412
ASSIGN UNIQUE IDENTIFICATION CODE
413a
PLACE DATA IN PREDETERMINED FORMAT
413b
SEQUENCE DATA
413c
COMPRESSING THE DATA
413d
STORE AS A FILE
413e
STORE IN LARGE CAPACITY STORAGE
414
RECEIVE TRANSMISSION REQUEST
415
SEND TO REMOTE LOCATION
416
RECEIVE AT REMOTE LOCATION
417
BUFFER THE DATA
418
PLAYBACK AT TIME REQUESTED
419

FIG. 7

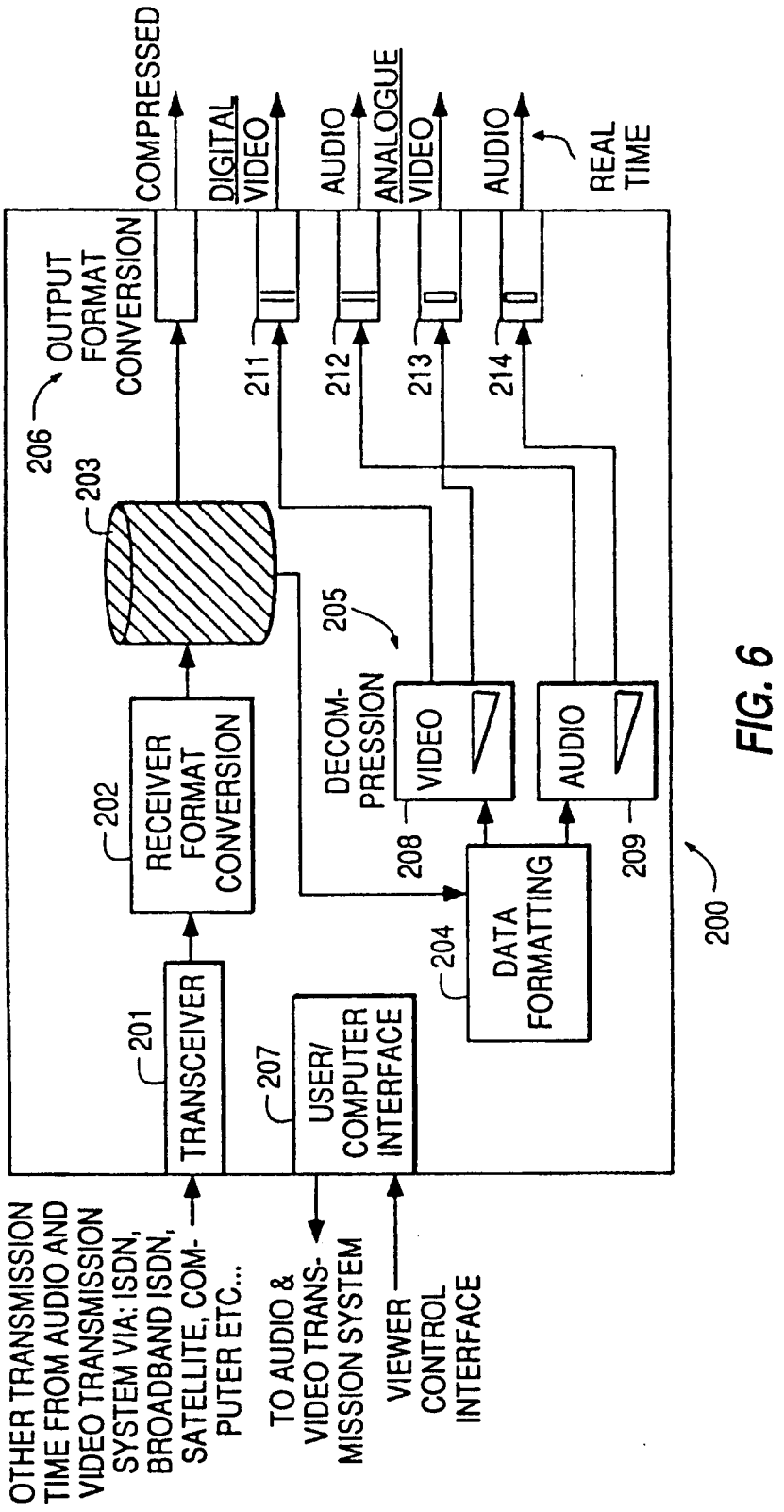

COMPRESSED
DIGITAL VIDEO
AUDIO
ANALOGUE VIDEO
AUDIO
REAL TIME
OUTPUT FORMAT CONVERSION
206
203
211
212
213
214
205
DECOM-PRESSION
VIDEO
AUDIO
208
209
202
RECEIVER FORMAT CONVERSION
204
DATA FORMATTING
200
201
TRANSCEIVER
207
USER/ COMPUTER INTERFACE
OTHER TRANSMISSION TIME FROM AUDIO AND VIDEO TRANSMISSION SYSTEM VIA: ISDN, BROADBAND ISDN, SATELLITE, COM-PUTER ETC...
TO AUDIO & VIDEO TRANS-MISSION SYSTEM
VIEWER CONTROL INTERFACE

FIG. 6

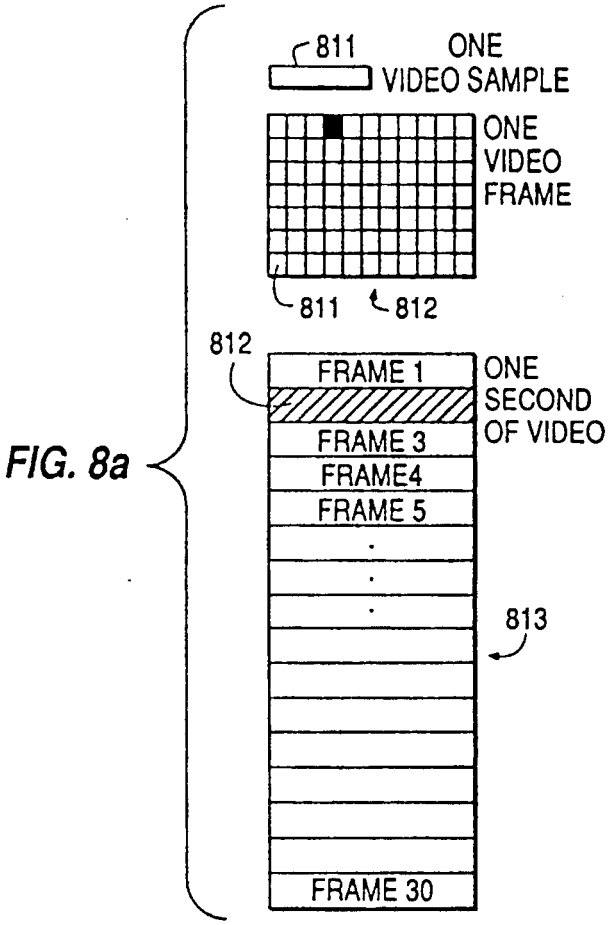

811
ONE
VIDEO SAMPLE
ONE
VIDEO
FRAME
811
812
812
FRAME 1
FRAME 3
FRAME4
FRAME 5
FRAME 30
ONE
SECOND
OF VIDEO
813

FIG. 8a

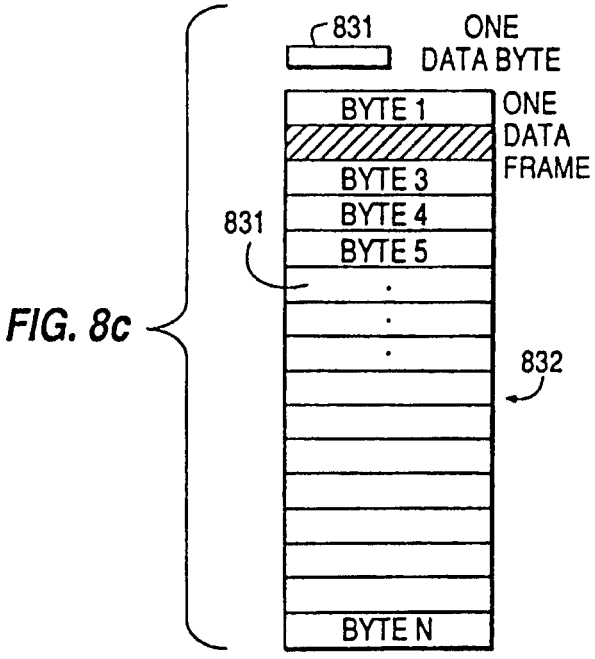

831
ONE
DATA BYTE
BYTE 1
BYTE 3
BYTE 4
BYTE 5
BYTE N
ONE
DATA
FRAME
831
832

FIG. 8c

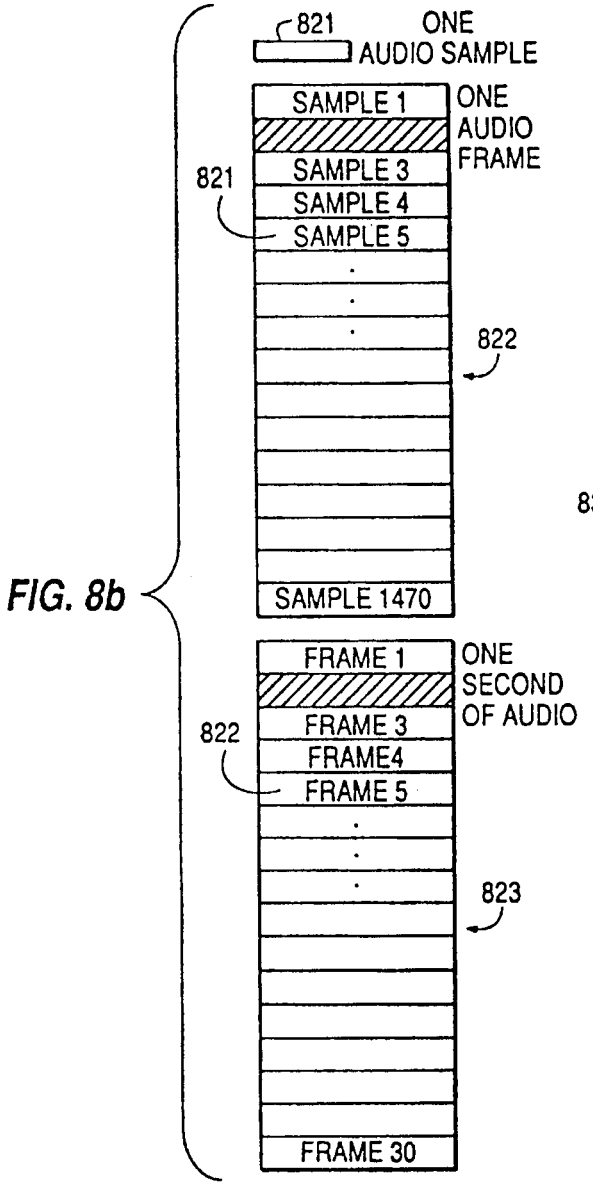

821
ONE AUDIO SAMPLE
SAMPLE 1
SAMPLE 3
SAMPLE 4
SAMPLE 5
SAMPLE 1470
ONE AUDIO FRAME
821
822
FRAME 1
FRAME 3
FRAME4
FRAME 5
FRAME 30
ONE SECOND OF AUDIO
822
823

FIG. 8b

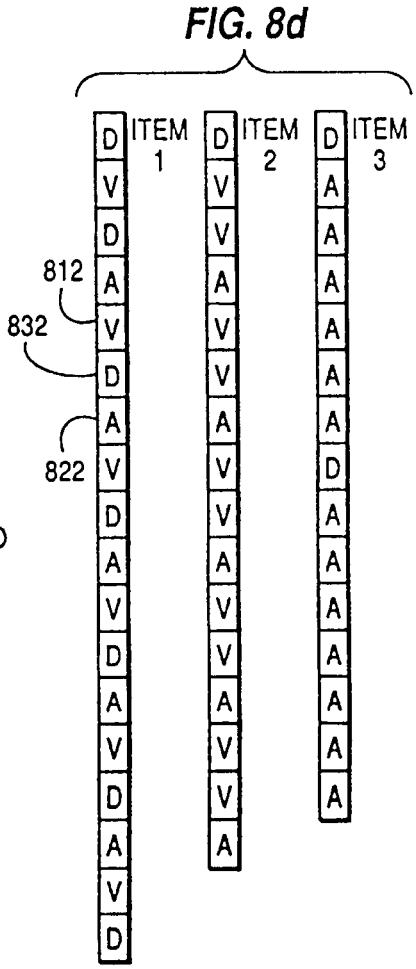

ITEM 1
ITEM 2
ITEM 3
812
832
822

FIG. 8d

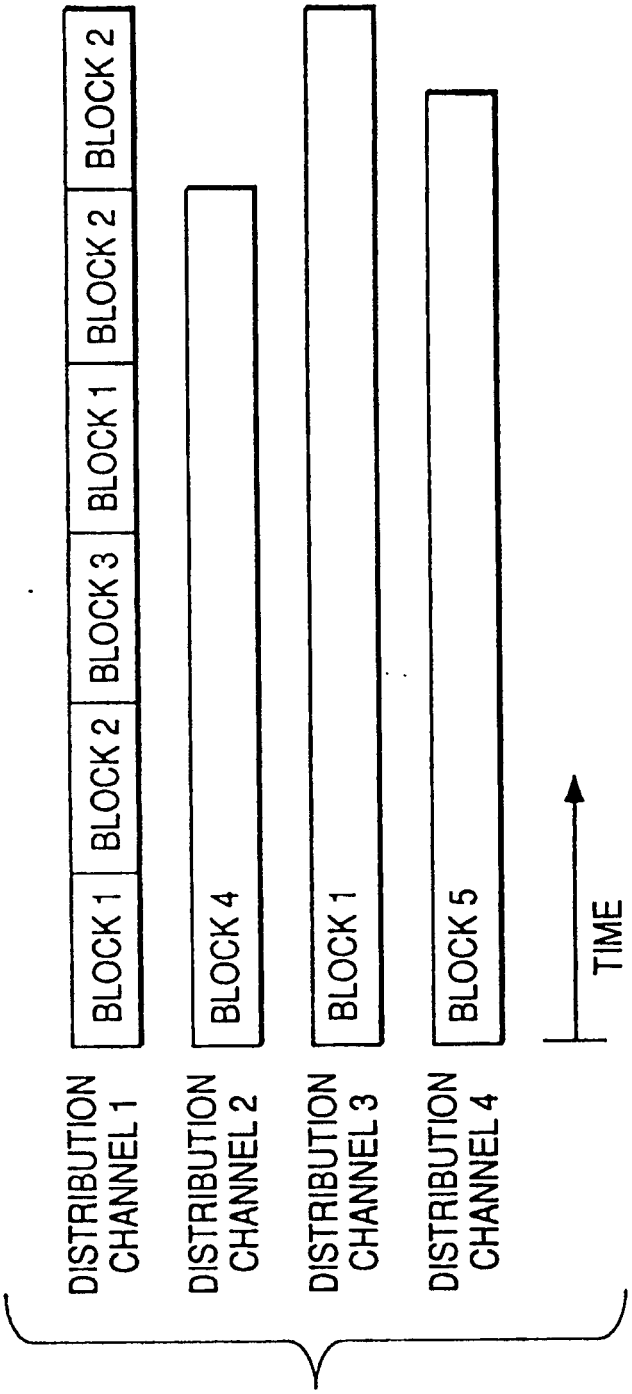

BLOCK 1
BLOCK 2
BLOCK 3
BLOCK 1
BLOCK 2
BLOCK 2
BLOCK 4
BLOCK 1
BLOCK 5
TIME
DISTRIBUTION CHANNEL 1
DISTRIBUTION CHANNEL 2
DISTRIBUTION CHANNEL 3
DISTRIBUTION CHANNEL 4

FIG. 8e

AUDIO AND VIDEO TRANSMISSION AND RECEIVING SYSTEM

BACKGROUND OF THE INVENTION

The present invention relates generally to an audio and video transmission and receiving system, and more specifically to such a system in which the user controls the access and the playback operations of selected material.

At the present time, only a video cassette recorder (VCR) or a laser disk player (LDP) allow a viewer to enjoy control over selection of particular audio/video material. Using either a VCR or an LDP requires the viewer to obtain a video tape either by rental or by purchase. Remote accessing of the material has not yet been integrated into an efficient system.

Several designs have been developed which provide the viewer with more convenient means of accessing material. One such design is disclosed in U.S. Pat. No. 4,506,387, issued to Walter. The Walter patent discloses a fully dedicated, multi-conductor, optical cable system that is wired to the viewer's premises. While the system affords the viewer some control over accessing the material, it requires that a location designated by the viewer be wired with a dedicated cable. The Walter system further requires the viewer be at that location for both ordering and viewing the audio/video material.

U.S. Pat. No. 4,890,320, issued to Monslow, describes a system which broadcasts viewer selected material to a viewer at a prescribed time. This system is limited in that it requires multiple viewers in multiple locations to view the audio/video material at the time it is broadcast, rather than allowing each viewer to choose his or her own viewing time. The system disclosed in Monslow also does not allow for the stop, pause, and multiple viewing functions of existing VCR technology.

U.S. Pat. No. 4,590,516, issued to Abraham, discloses a system that uses a dedicated signal path, rather than multiple common carriers, to transmit audio/video programming. The receiver has no storage capability. The system provides for only display functions, which limits viewing to the time at which the material is ordered. Like Monslow, the Abraham system does not allow for the stop, pause, and multiple viewing functions of existing VCR technology.

U.S. Pat. No. 4,963,995, issued to Lang, discloses an audio/video transceiver with the capability of editing and/or copying from one video tape to another using only a single tape deck. Lang does not disclose a system with one or more libraries wherein a plurality of system subscribers may access information stored in the film and tape library or libraries, and play back the selected information at a time and place selected by the subscriber.

It is therefore an object of the present invention to provide a user with the capability of accessing audio/video material by integrating both accessing and playback controls into a system that can use multiple existing communications channels.

It is a further object of the present invention to provide a picture and sound transmission system which allows the user to remotely select audio/video material from any location that has either telephone service or a computer.

A still further object of the present invention is to provide a picture and sound transmission system

wherein the selected audio/video material is sent over any one of several existing communication channels in a fraction of real time to any location chosen by the user that has a specified receiver.

Another object of the present invention is to provide a picture and sound transmission system wherein the user may play back the selected audio/video material at any time selected by the user and retain a copy of the audio/video material for multiple playbacks in the future.

Another object of the present invention is to provide a picture and sound transmission system wherein the information requested by the user may be sent as only audio information, only video information, or as a combination of audio and video information.

Additional objects and advantages of the invention will be set forth in the description which follows, and in part will be obvious from the description, or may be learned by practice of the invention. The objects and advantages of the invention may be realized and obtained by means of the instrumentalities and combinations particularly pointed out in the appended claims.

SUMMARY OF THE INVENTION

To achieve the objects in accordance with the purposes of the present invention, as embodied and described herein, the transmission and receiving system for providing information to remote locations comprises source material library means prior to identification and compression; identification encoding means for retrieving the information for the items from the source material library means and for assigning a unique identification code to the retrieved information; conversion means, coupled to identification encoding means, for placing the retrieved information into a predetermined format as formatted data; ordering means, coupled to the conversion means, for placing the formatted data into a sequence of addressable data blocks; compression means, coupled to the ordering means, for compressing the formatted and sequenced data; compressed data storing means, coupled to the compression means, for storing as a file the compressed sequenced data received from the compression means with the unique identification code assigned by the identification encoding means; and transmitter means, coupled to the compressed data storing means, for sending at least a portion of a specific file to a specific one of the remote locations.

The present invention further comprises a distribution method responsive to requests identifying information to be sent from a transmission system to a remote location, the method comprising the steps of storing audio and video information in a compressed data form; requesting transmission, by a user, of at least a part of the stored compressed information to the remote location; sending at least a portion of the stored compressed information to the remote location; receiving the sent information at the remote location; buffering the processed information at the remote location; and playing back the buffered information in real time at a time requested by the user.

Additionally, the present invention comprises a receiving system responsive to a user input identifying a choice of an item stored in a source material library to be played back to the subscriber at a location remote from the source material library, the item containing information to be sent from a transmitter to the receiving system, and wherein the receiving system comprises

transceiver means for automatically receiving the requested information from the transmitter as compressed formatted data blocks; receiver format conversion means, coupled to the transceiver means, for converting the compressed formatted data blocks into a format suitable for storage and processing resulting in playback in real time; storage means, coupled to the receiver format conversion means, for holding the compressed formatted data; decompressing means, coupled to the receiver format conversion means, for decompressing the compressed formatted information; and output data conversion means, coupled to the decompressing means, for playing back the decompressed information in real time at a time specified by the user.

BRIEF DESCRIPTION OF THE DRAWINGS

The accompanying drawings, which are incorporated in and constitute a part of the specification, illustrate the presently preferred apparatus and method of the invention and, together with the general description given above and the detailed description of the preferred embodiment given below serve to explain the principles of the invention. In the drawings:

FIGS. 1*a*-1*g* are high level block diagrams showing different configurations of the transmission and receiving system of the present invention;

FIGS. 2*a* and 2*b* are detailed block diagrams of preferred implementations of the transmission system of the present invention;

FIG. 3 is a flowchart of a preferred method of ordering a selection from a library in accordance with the present invention;

FIG. 4 is a flowchart of a preferred method of user request via a user interface of the present invention;

FIG. 5 is a flowchart of a preferred method of implementing a queue manager program of the present invention;

FIG. 6 is a block diagram of a preferred implementation of the receiving system of the present invention;

FIG. 7 is a flowchart of a preferred method of distribution of the present invention; and

FIGS. 8*a*-8*e* are block diagrams of preferred implementations of data structures and data blocking for items in the audio and video distribution system of the present invention.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

FIGS. 1*a*-1*g* are high level block diagrams showing different configurations of the transmission and receiving system of the present invention. FIGS. 1*a*, 1*b*, 1*d*, 1*e*, 1*f*, and 1*g* each show transmission system **100**, described in more detail below with respect to FIGS. 2*a* and 2*b*. A user of the transmission and receiving system of the present invention preferably accesses transmission system **100** by calling a phone number or by typing commands into a computer. The user then chooses audio and/or video material from a list of available items which he or she wants to listen to and/or watch.

As shown in FIG. 1*a*, the transmission and receiving system may preferably comprise a peer to peer configuration where one transmission system **100** communicates with one reception system **200**. As shown in FIG. 1*b*, the transmission and receiving system of the present invention may alternatively comprise a plurality of reception systems **200**, **200'**, **200''**, and **200'''**, which are each associated with a single transmission system **100**.

FIG. 1*c* shows a high level block diagram of the transmission and receiving system of the present invention including remote order processing and item database **300**, described in more detail with respect to FIG. 3. Remote order processing and item database **300** preferably enables users to access desired items by remote communication. The remote order processing and item database **300** may communicate with a plurality of transmission systems **100**, **100'**, **100''**, and **100'''**, each of which communicates with a respective set of reception systems **200**, **200'**, **200''**, and **200'''**. Each of the reception systems in sets **200**, **200'**, **200''**, and **200'''** may preferably communicate with a plurality of users.

FIG. 1*d* shows a high level block diagram of the transmission and receiving system of the present invention including a transmission system **100** distributing to a plurality of users via a reception system **200** configured as a cable television system.

FIG. 1*e* shows a high level block diagram of the transmission and receiving system of the present invention including a transmission system **100** distributing to a plurality reception systems **200** and **200'**. In the configuration shown in FIG. 1*e*, reception system **200** is a direct connection system wherein a user is directly connected to transmission system **100**. Reception system **200'** preferably includes a first cable television system **200***a* and a second cable television system **200***b*. Users of cable television systems **200***a* and **200***b* are indirectly connected to transmission system **100**.

FIG. 1*f* shows a high level block diagram of the transmission and receiving system of the present invention including transmission system **100** distributing via several channels to reception systems **200** and **200'**. Reception system **200** is preferably non-buffering. In such a system, users are directly connected to transmission system **100**, as in reception system **200** in FIG. 1*e*.

Reception system **200'** shown in FIG. 1*f* is a cable television system, as shown in reception systems **200'** of FIG. 1*e*. In FIG. 1*f*, the reception system **200'** is preferably buffering, which means that users may receive requested material at a delayed time. The material is buffered in intermediate storage device **200***c* in reception system **200'**.

In the configuration of FIG. 1*f*, decompression of the requested material may preferably occur at the head end of a cable television reception system **200'**. Thus, distribution may be provided to users via standard television encoding methods downstream of the head end of the cable distribution system. This method is preferred for users who only have cable television decoders and standard television receivers.

FIG. 1*g* shows a high level block diagram of the transmission and receiving system of the present invention including transmission system **100** distributing to a reception system **200**, which then preferably transmits requested material over airwave communication channels **200***d*, to a plurality of users. The transmission and receiving system shown in FIG. 1*g* may preferably transmit either compressed or uncompressed data, depending on the requirements and existing equipment of the user. The airwave transmission and receiving system shown in FIG. 1*g* may preferably employ either VHF, UHF or satellite broadcasting systems.

With respect to the transmission and receiving sytems set forth in FIGS. 1*a*-1*g*, the requested material may be fully compressed and encoded, partly decompressed at some stage in transmission system **100**, or fully decompressed prior to transmission. The reception systems

200 may either buffer the requested material for later viewing, or decompress in real time the requested material as it is distributed by transmission system 100. Alternatively, the reception systems 200 of the present invention may perform a combination of buffering and non-buffering by buffering some of the requested material and decompressing the remainder of the requested material for immediate viewing as it is distributed by transmission system 100.

In direct connection configurations, such as reception systems 200 shown in FIGS. 1*e* and 1*f*, the user preferably selects the reception system 200 to which the requested material is sent, and optionally selects the time playback of the requested material as desired. Accordingly, the user may remotely access the transmission system 100 from a location differenct than the location of reception system 200 where the material will be sent and/or played back. Thus, for example, a user may preferably call transmission system 100 from work and have a movie sent to their house to be played back after dinner or at any later time of their choosing.

In non-direct connection reception systems such as shown in reception system 200' of FIG. 1*f*, intermediate storage device 200*c* may preferably include, for example, sixteen hours of random access internal audio and video storage. A reception system with such storage is capable of storing several requested items for future playback. The user could then view and/or record a copy of the decompressed requested material in real time, or compressed in non-real time, at a time of their choosing. Accordingly, the user would not have to make a trip to the store to purchase or rent the requested material.

In any of the transmission and receiving systems illustrated in FIGS. 1*a*-1*g*, the requested material may be copy protected. To achieve copy protection, the requested material, as an item, is encoded as copy protected during storage encoding in transmission system 100. The user may then play back the item only one time. The user may also optionally review select portions of the item prior to its automatic erasure from the memory of the reception system 200. In this way, requested material may be distributed to "view only" users and also to "view and copy" users who wish to retain copies of the distributed items.

Copy protected programs, when decompressed and played back, would have a copy protection technique applied to the analog and digital output signals. The analog video output is protected from copying through the use if irregular sync signals, which makes the signal viewable on a standard television but not recordable on a audio/video recorder. Digital output protection is effected through copy protect bit settings in the digital output signal, thus preventing a compatible digital recorder from recording the digital audio and/or video signal stream. A protected item will not be passed to the compressed data port of the digital recorder for off line storage.

FIGS. 2*a* and 2*b* illustrate detailed block diagrams of preferred implementations of the transmission system 100 of the present invention. Transmission system 100 may either be located in one facility or may be spread over a plurality of facilities. A preferred embodiment of transmission system 100 may preferably include only some of the elements shown in FIGS. 2*a* and 2*b*.

Transmission system 100 of a preferred embodiment of the present invention preferably includes source material library means for temporary storage of items prior to conversion and storage in a compressed data library means. The items of information may include analog and digital audio and video information as well as physical objects such as books and records which require conversion to a compatible media type before converting, compressing and storing their audio and video data in the compressed data library means.

As shown in FIG. 2*a*, the source material library means included in transmission system 100 preferably includes a source material library 111. The source material library 111 may include different types of materials including television programs, movies, audio recordings, still pictures, files, books, computer tapes, computer disks, documents of various sorts, musical instruments, and other physical objects. These materials are converted to or recorded on a media format compatible to the digital and analog inputs of the system prior to being compressed and stored in a compressed data library 118. The different media formats preferably include digital or analog audio and video tapes, laser disks, film images, optical disks, magnetic disks, computer tapes, disks and, cartridges.

The source material library 111, according to a preferred embodiment of the present invention, may preferably include a single source material library or a plurality of source material libraries. If there are a plurality of source material libraries, they may be geographically located close together or may be located far apart. The plurality of source material libraries may communicate using methods and channels similar to the methods and channel types which libraries may employ for communication with the receiving system 200 of the user, or the source material libraries may communicate via any available method.

Prior to being made accessible to a user of the transmission and receiving system of the present invention, the item must be stored in at least one compressed data library 118, and given a unique identification code by identification encoder 112. Storage encoding, performed by identification encoder 112, aside form giving the item a unique identification code, optionally involves logging details about the item, called program notes, and assigning the item a popularity code. Storage encoding may be performed just prior to conversion of the item for transmission to reception system 200, at any time after starting the conversion process, or after storing the item in the compressed data library 118.

In a preferred embodiment of the present invention, the method of encoding the information involves assigning a unique identification code and a file address to the item, assigning a popularity code, and inputting the program notes. This process is identical for any of the different media types stored in the source material library 111.

The transmission system 100 of the present invention also preferably includes conversion means 113 for placing the items from source material library 111 into a predetermined format as formatted data. In the preferred embodiment, after identification encoding is performed by identification encoder 112, the retrieved information is placed into a predetermined format as formatted data by the converter 113. The items stored in source material library 111 and encoded by identification encoder 112 may be in either analog or digital form. Converter 113 therefore includes analog input receiver 127 and digital input receiver 124. If items have only one format, only one type of input receiver 124 or 127 is necessary.

When the information from identification encoder **112** is digital, the digital signal is input to the digital input receiver **124** where it is converted to a proper voltage. A formatter **125** sets the correct bit rates and encodes into least significant bit (lsb) first pulse code modulated (pcm) data. Formatter **125** includes digital audio formatter **125***a* and digital video formatter **125***b*. The digital audio information is input into a digital audio formatter **125***a* and the digital video information, if any, is input into digital video formatter **125***b*. Formatter **125** outputs the data in a predetermined format.

When the retrieved information from identification encoder **112** is analog, the inforamtion is input to an analog-to-digital converter **123** to convert the analog data of the retrieved information into a series of digital data bytes. Converter **123** preferably forms the digital data bytes into the same format as the output of formatter **125**.

Converter preferably includes an analog audio converter **123***a* and an analog video converter **123***b*. The analog audio converter **123***a* preferably converts the retrieved audio signal into pcm data samples at a fixed sampling rate. The analog video converter **123***b* preferably converts the analog video information, retrieved from identification encoder **123**, into pcm data also at fixed sampling rates.

If the retrieved information being converted contains only audio information, then the audio signal is fed to the appropriate digital audio input or analog input. When the retrieved information contains both audio and video information, the audio and video signals are passed simultaneously to the audio and video converter inputs. Synchronization between the audio and video data can be maintained in this way.

If, for example, the retrieved information to be converted from the source material library **111** is a motion picture film, the picture frames in the film are passed through a digital telecine device to the digital input receiver **124**. Format conversion is then preferably performed by digital video formatter **125***b*. Accompanying audio information is passed through an optical or magnetic digital playback device. This device is connected to digital audio formatter **125***a*.

In some cases, such as in inter-library transfers, incoming materials may be in a previously compressed form so that there is no need to perform compression by precompression processor **115** and compressors **128** and **129**. In such a case, retrieved items are passed directly from identification encoder **112** to the compressed data formatter **117**. The item database records, such as the program notes which may also be input from another system, to the compressed data formatting section **117**, where this data, if necessary, is reformatted to make it compatible with the material stored in compressed data library **118**. Such material may be received in the form of digital tapes or via existing communication channels and may preferably input directly to a short term storage **117'** in the compressed data formatting section **117**.

The transmission system **100** of the present invention also preferably includes ordering means for placing the formatted information into a sequence of addressable data blocks. As shown in FIG. **2***a*, the ordering means in the preferred embodiment includes time encoder **114**. After the retrieved information is converted and formatted by the converter **113**, the information may be time encoded by the time encoder **114**. Time encoder **114** places the blocks of converted formatted information from converter **113** into a group of addressable blocks. The preferred addressing scheme employs time encoding. Time encoding allows realignment of the audio and video information in the compressed data formatting section **117** after separate audio and video compression processing by precompression processor **115** and compressor **116**.

The converted formatted information of the requested material is then preferably in the form of a series of digital data bytes which represent frames of video data and samples of the audio data. A preferred relationship of the audio and video bytes to each other is shown in FIG. **8**. Incoming signals are input and converted in sequence, starting with the first and ending with the last frame of the video data, and starting with the first and ending with the last sample of the audio data. Time encoding by time encoder **114** is achieved by assigning relative time markers to the audio and video data as it passes from the converter **113** through the time encoder **114** to the precompression processor **115**. Realignment of audio and video data, system addressing of particular data bytes, and user addressing of particular portions of items are all made possible through time encoding.

Through the use of the address of an item and its frame number it is possible to address any particular block of audio or video data desired. From here, further addressing down to the individual byte is possible. Frames and groups of frames may preferably be further broken down, as necessary to the individual bytes and bits, as required for certain processing within the system.

User and system addressing requirements dictate the level of granularity available to any particular section of the system. Users are able to move through data in various modes, thus moving through frame addresses at various rates. For example, a user may desire to listen to a particular song. They may preferably enter the song number either when requesting the item from the compressed data library **118** and only have that song sent to their receiving system **200** or they may preferably select that particular song from the items buffered in their receiving system **200**. Internal to the system, the song is associated with a starting frame number, which was indexed by the system operator via the storage encoding process. The system item database may contain information records for individual frames or groups of frames. These can represent still frames, chapters, songs, book pages, etc. The frames are a subset of, and are contained within, the items stored in the compressed data library **118**. Time encoding by time encoder **114** makes itmes and subsets of items retrieveable and addressable throughout the transmission system **100**. Time encoding enables subsequent compression of the information to be improved because data reduction prpcesses may be performed in the time dimension. This is described in greater detail below.

The transmission system **100** of the present invention also preferably includes data compression means for compressing the formatted and sequenced data. The sequence of addressable data blocks which was time encoded and output by time encoder **114** is preferably sent to precompression processor **115**. The data arriving from time encoder **114** may be at various frame rates and of various formats. Precompression processor **115** preferably includes audio precompressor **115***a* and video precompressor **115***b*.

Video precompression processor **115***b* buffers incoming video data and converts the aspect ratio and frame

rate of the data, as required by compression processor **116**. The frame buffer **131** of video precompression processor **115***b* holds all incoming data until the data is compressed by the data compressor **116**. The incoming video data is processed for sample rate optimization, aspect ratio fitting and buffered in buffer **130** for compression processing by the video precompression processor **115***b*.

Video precompression processor **115***b* processes the incoming video data so that if fits into the aspect ratio of the transmission and receiving system of the present invention. When incoming material with a different aspect ratio than the aspect ratio of the system is selected, a chosen background is preferably placed around the inactive region of the video information. In this way, no data is lost to differences in the aspect ratio between incoming material, and the converted and compressed data stored in transmission system **100**. Images resulting from a different aspect ratio may have an inactive region where background information is contained, or may be converted into a best fit arrangement. Output from the video precompression processor **115***b* is stored in the frame buffer **131**, which is dual ported and is directly addressable by video compressor **129**.

The incoming audio data is processed for sample rate and word length optimization and is then buffered in buffer **130** for compression processing by the audio precompression processor **115***a*Audio precompression processor **115***a* may preferably transcode incoming audio information, as required, to create the optimum sample rate and word lengths for compression processing. The output of the audio precompression processor **115***a* is a constant sample rate signal of a fixed word length which is buffered in frame buffer **130**. The frame buffer **130** is dual ported and is directly addressable by audio compressor **128**. Blocking the audio data into frames at audio precompression processor **115***a* makes it possible to work with the audio data as addressable packets of information.

Once precompression processing is finished, the frames are compressed by the data compressor **116**. Compressor **116** preferably comprises an audio data compressor **128** and a video data compressor **129**. The benefits of data compression performed by data compressor **116** are shortened transmission time, faster access time, greater storage capacity, and smaller storage space requirements. Compression processing performed by compessors **128** and **129** requires multiple samples of data to perform optimum compression. Audio and video informaion is preferably converted into blocks of data organized in groups for compression processing by audio compressor **128** and video compressor **129**, respectively. These blocks are organized as frames, and a number of frames are contained respectively in the buffers **130** and **131**. By analyzing a series of frames it is possible to optimize the compression process.

Audio data is preferably compressed by audio compressor **128** by application of an adaptive differential pulse code modulation (ADPCM) process to the audio data. This compression process, which may be implemented by the apt-x 100 digital audio compression system, is manufactured by Audio Processing Technology (APT). Audio compression ratios of 8X or greater are achieved with the APT system.

Compression by compressor **116** may be performed on a group of 24 video frames may preferably be passed in sequence to the frame buffer **130** of the video precompression processor **115***b* where they are analyzed by video compressor **129** which performs data reduction processing on the video data. Video compression is preferably performed by video compressor **129**. Video compression is achieved by the use of processors running algorithms designed to provide the greatest amount of data compression possible. Video data compression preferably involves applying two processes: a discrete cosine transform, and motion compensation. This process is described in "A Chip Set Core of Image Compression", by Artieri and Colavin. Multiple frames of video data may preferably be analyzed for patterns in the horizontal (H), vertical (V), diagonal (zigzag) and time (Z) axis. By finding repetition in the video data, redundancy may be removed and the video data may be compressed with a minimal loss of information.

In accordance with a preferred embodiment of the present invention, the transmission system **100** may further comprise compressed data storing means, coupled to the compression means, for storing as a file the compressed sequenced data with the unique identification code received from the data compression means. After compression processing by compressor **116**, the compressed audio and video data is preferably formatted and placed into a single file by the compressed data storage means **117**. The file may contain the compressed audio and/or video data, time markers, and the program notes. The file is addressable through the unique identification code assigned to the data by the identification encoder **112**.

Further, according to the present invention, the transmission system preferably includes compressed data library means for separately storing composite formatted data blocks for each of the files. The compressed data storage means preferably includes compressed data library **118**, as shown in FIG. **2***b*. After the data is processed into a file by the compressed data storage means **117**, it is preferably stored in a compressed data library **118**. In a preferred embodiment, compressed data library **118** is a network of mass storage devices connected together via a high speed network. Access to any of the files stored in compressed data library **118** is available from multiple reception systems **200** connected to the transmission and receiving system.

Stored items are preferably accessed in compressed data library **118** through a unique address code. The unique address code is a file address for uniquely identifying the compressed data items stored in the compressed data library section of a library system. This file address, combined with the frame number, and the library system address allow for complete addressability of all items stored in one or more compressed data libraries **118**. Compressed data library addresses along with receiving system addresses are used to form a completely unique address for distribution system control.

The unique address code is an address assigned to the item by the system operator during storage encoding, which is preferably done prior to long term storage in the compressed data library **118**. In a preferred embodiment, the unique address code is used for requesting and accessing information and items throughout the transmission and receiving system. The unique address code makes access to the requested data possible.

The storage encoding process performed by encoder **112** also allows entry of item notes and production credits. Production credits may include the title, names of

the creators of the item such as the producer, director, actors, etc. Other details regarding the item which may be of interest and which may make the items more accessible are kept in an item database.

Item addresses are mapped to item names by identification encoder **112** and may preferably be used as an alternative method of accessing items. The item names are easier to remember, thus making user access more intuitive by using item names. The storage encoding entry process performed in identification encoder **112** operates a program which updates a master item database containing facts regarding items in the compressed data library system. The storage encoding process may be run by the system operator whereby the system operator accesses the master item database to track and describe items stored in one or more compressed data libraries. The names and other facts in the item database may preferably be updated at any time via the storage encoding process. Changes made to the master item database may be periodically sent to the remote order processing and item database **300**.

As described in more detail later, a user may preferably access an item via its unique identification code, via its title, or the user may use other known facts for accessing an item. The user may access items in the compressed data library **118** directly using the unique address code or the user may obtain access via the remote order processing and item database **300**. Indirect access via the remote order processing and item database **300** is possible using, for example, a synthesized voice system, a query type of computer program interface, or customer assistance operators. In addition to providing interactive access to the remote order processing and item database **300**, a catalog listing some or all available titles may also preferably be published. With a published catalog, users may obtain the unique address code for an item very easily thereby allowing for retrieval from the compressed data library **118** without any help from an interactive system.

To achieve user access via an interactive system, facts about the items may be kept in files as a part of the items or the facts may be kept separately, for example, by systems which only to inform users of the available items and take orders. For example, in systems which have portions split in separate locations, the facts about the items may be separated from the items themselves and stored in separate files. A system of this type can distribute user orders to other portions of the transmission and receiving system for ultimate distribution to the requesting user. Further, to support a plurality of users, multiple versions of the item database may preferably reside either on multiple database servers, in catalogs, or on other computer systems.

The item database master may reside in the system control computer **1123** where may be is updated and kept current to the contents of the compressed data library **118**. The data stored in the item database master may be accessed by users via application programs, running on the system control computer **1123**, and on the reception system **200** of the user. Users may connect to the item database via any available telecommunication channels. Copies of the item database master may be updated and informed of new entries into compressed data library **118** at periodic intervals determined by the system manager.

Other copies of the item database master may also be made available to users from the remote order processing and item database **300** which batch processes and downloads user requests to the control computer **1123** of the compressed data library **118** via standard telecommunications or high speed communication channels. Moreover, multiple remote order processing and item database **300** sites make it possible for more locations to process orders than there are library facilities, and thus make order processing more efficient.

Preferably, access of a requested item via the remote order processing and item database **300** operates as follows. If the user does not know the title of the desired item, he or she may request the item by naming other unique facts related to the item. For example, a user would be able to access an item about Tibetan Medicine by asking for all items which include information about "Tibet" and include information about "Medicine." The remote order processing and item database **300** would then be searched for all records matching this request. If there is more than one item with a match, each of the names of the matching items are preferably indicated to the user. The user then selects the item or items that he or she desires. Upon selection and confirmation, by the user, a request for transmission of a particular item or items is sent to the distribution manager program of the system control computer **1123**. The request contains the address of the user, the address of the item, and optionally includes specific frame numbers, and a desired viewing time of the item.

The storage encoding process performed by identification encoder **112** also allows entry of a popularity code. The popularity code is preferably assigned on the basis of how often the corresponding item is expected to be requested from the compressed data library **118**. This popularity code can be used to determine the most appropriate form of media for storage of the compressed data in a mixed media system. Mixed media systems are preferably employed as more cost effective storage in very large compressed data libraries **118**. Once assigned, the popularity code may be dynamically updated, by factoring item usage against system usage. Thus, stored items are dynamically moved to the most appropriate media over their life in the compressed data library **118**. If a particular item stored in compressed data library **118** is retrieved frequently by users, storage in compressed data library **118** is preferably on higher speed, more reliable, and probably more expensive media. Such media includes Winchester and magneto-optical disks.

If an item stored in compressed data library **118** is retrieved less frequently, it may be stored in the compressed data library **118** on a digital cassette tape. Examples of such cassette tapes are a Honeywell RSS-600 (Honeywell Inc. Minneapolis, Minn.), Summus JukeBoxFilm and tape library (Summus Computer Systems, Houston, Tex. 800-255-9638), or equivalent cassette tapes. All items stored in the compressed data library **118** are on line and are connected to the high speed network. Thus, they may be readily accessed.

Instead of using a remote order processing and item database **300**, the compressed data library **118** may include the program notes which were input by the system operator. The program notes may preferably include the title of the item stored in the compressed data library **118**, chapter or song titles, running times, credits, the producer of the item, acting and production credits, etc. The program notes of an item stored in the compressed data library **118** may be thus contained within the compressed data file formed in the compressed data formatter **117**.

In some cases, where multiple compressed data libraries **118** are organized, the popularity code may dictate distribution of a particular item to multiple distribution systems. In such cases, a copy of the compressed data is sent to another library and the other library can then distribute the compressed data to users concurrently with the original compressed data library **118**.

The compressed data library **118** is composed of a network of storage devices connected through a High Performance Parallel Interface (HPPI) Super Controller (available from Maximum Strategy Inc., San Jose, Calif.). Therefore, multiple communication controllers may preferably access the large quantity of data stored in compressed data library **118** at very high speeds for transfer to a reception system **200** of a user upon request. For more details on this configuration see Ohrenstein, "Supercomputers Seek High Throughput and Expandable Storage", Computer Technology Review, pp. 33-39 April 1990.

The use of an HPPI controller allows file placement onto multiple mass storage devices of the compressed data library **118** with a minimum of overhead. Database management software controls the location and tracking of the compressed data library **118** which can be located across multiple clusters of file servers connected together by one or more high speed networks over multiple systems.

The transmission system **100** of the present invention may also preferably include library access/interface means for receiving transmission requests to transmit items and for retrieving formatted data blocks stored in the compressed data library **118** corresponding to the requests from users. The compressed audio and/or video data blocks, along with any of the information about the item stored in the compressed data library **118** may be accessed via library access interface **121**. The library access interface **121** receives transmission requests either directly from the users or indirectly by remote order processing and item database **300**. The transmission format means **119** receives the request and retrieves the composite formatted data block of the requested item stored in compressed data library **118** and converts the compressed formatted data block into a format suitable for transmission. The requested item is then sent to the user via the transmitter **122** or directly via interface **121**.

In a preferred embodiment of the present invention, customer access of an item stored in compressed data library **118** via the library access interface **121** may be performed in various ways. The methods of requesting a stored item are analogous to making an airline reservation or transferring funds between bank accounts. Just as there are different methods available for these processes it is desirable to have several ordering methods available to the users of the system of the present invention. For example, telephone tone decoders and voice response hardware may be employed. Additionally, operator assisted service or user terminal interfaces may be used.

Customer access via telephone tone decoders and voice response hardware is completely electronic and may preferably be performed between a system user and a computer order entry system. The user may obtain help in ordering an item from a computer synthesized voice. With such an access method, the user will normally be accessing a dynamic catalog to assist them. Confirmation of selections and pricing information may preferably be given to the user prior to completion of the transaction.

This process of access, performed by remote order processing and item database configuration **300**, shown in FIG. **1c**, preferably includes the following steps, shown in flowchart **3000** of FIG. **3**. First, the user calls the system access number (step **3010**). Upon successfully dialing the system access number, the user receives instructions from the system (step **3020**). The instructions may preferably include steps the user must take in order to place an order. Preferably, the instructions may be bypassed by the experienced user who knows how to place an order.

The user then enters a customer ID code by which the system accesses the user's account, and indicates to the system that the user is a subscriber of the system (step **3030**). In response to the user entering his ID code in step **3030** the system confirms whether the user is in good standing (step **3040**). If the user is in good standing, the system queues the user to input his request (step **3050**).

The user request may preferably be made from a catalog sent to each of the subscribers of the system. The user will preferably identify his choice and enter the corresponding identification code of the item (step **3060**). The system then preferably confirms the selection that the user has made and informs the user of the price of the selection (step **3070**).

The user then indicates whether the confirmation performed in step **3070** is correct (step **3080**). If the confirmation performed in step **3070** is correct, the user so indicates and then inputs a desired delivery time and delivery location (step **3090**).

If the confirmation performed in step **3070** does not result in the selection desired by the user, the user reinputs the item identification code in step **3060** and the confirmation steps **3070** and **3080** are repeated. Therefore, proper selection of the selected item is insured. Once there is confirmation, the user enters the playback time and destination in step **3090**.

The user then preferably confirms that the order is correct (step **3100**). The confirmation performed in step **3100** includes confirmation of the entire transaction including the selected item, the selected time of playback, and the location of playback. The transaction is then completed and the request is placed on a transmission queue at the appropriate compressed data library **118** (step **3110**).

Access by the users via operator assisted service includes telephone operators who answer calls from the users. The operators can sign up new customers, take orders, and help with any billing problems. The operators will preferably have computer terminals which give them access to account information and available program information. Operators can also assist a user who does not know a title by looking up information stored in files which may contain the program notes, as described above. Once the chosen program is identified, the operator informs the user of the price. After the user confirms the order, the user indicates the desired delivery time and destination. The operator then enters the user request into the system. The request is placed in the transmission queue.

Access by a user terminal interface method provides the user with access from various terminals including personal computers, and specialized interfaces built into the reception system **200** for the user. Such access allows a user to do a search of available programs from a

computer screen. This process involves the steps **4000** shown in FIG. **4**.

FIG. **4** is a flowchart of a preferred method of user request via a user interface of the present invention. In the preferred method of FIG. **4**, the user first logs onto the user terminal interface (step **4010**). After the user logs on, the user may preferably select a desired item by searching the database of available titles in the library system control computer **1123** or any remote order processing and item database **300** (step **4020**). The search may preferably be performed using the database containing the program notes, described above with respect to FIGS. **2***a* and **2***b*. It is possible to process orders and operate a database of available titles at multiple locations remote of the source material library **111**. Users and order processing operators may preferably access such remote systems and may place transmission requests from these systems. Orders placed on these systems will be processed and distributed to the appropriate libraries. After the desired item is found, the user selects the item for transmission at a specific time and location (step **4030**).

To complete an order, the remote order processing and item database **300** preferably connects to the compressed data library **118** of choice via the library access interface **121** and communicates with the library system control computer **1123**. Preferably the user's account ID, identification of the item for transmission and the chosen destination for the item are communicated. Through employment of distributed order processing systems of this type many orders may be processed with minimal library overhead.

All transmission requests from the access methods are placed into a transmission queue managed by the library system control computer **1123**. This queue is managed by a program that controls the distribution of the requested items to the reception system **200** of the user. The queue manager program also operates in the system control computer and keeps track of the user ID, the chosen program and price, the user channel type, the number of requests for a given program, the latest delivery time, and the compressed data library media type (for example, high speed or low speed). From this information, the queue manager program makes best use of the available distribution channels and media for efficient transmission and storage of the requested items.

The queue manager program also manages the file transmission process for multiple requests for a single file, stored in the compressed data library **118**. During a given time period, the queue manager program will optimize access to the compressed data library **118**, wherever possible it will place the data on multiple outputs for simultaneous transmission to more than one requesting user.

The conversion performed by transmission data converter **119** encodes the data for the transmission channel. The transmission data converter transfers the desired segments of data from the compressed data library **118** onto the communication channel which is used to deliver the data to the reception system **200**.

The transmission system **100** of the present invention preferably further includes transmitter means **122**, coupled to the compressed data library **118**, for sending at least a portion of a specific file to at least one remote location. The transmission and receiving system of the present invention preferably operates with any available communication channels. Each channel type is accessed through the use of a communications adaptor board or processor connecting the data processed in the transmission format converter **119** to the transmission channel.

A preferred embodiment of the present invention also includes means by which to access users via common access lines. These may include standard telephone, ISDN or B-ISDN, microwave, DBS, cable television systems, MAN, high speed modems, or communication couplers. Metropolitan Area Networks (MANs) which are common carrier or private communication channels are designed to link sites in a region. MANs are described by Morreale and Campbell in "Metropolitan-area networks" (IEEE Spectrum, May 1990 pp. 40–42). The communication lines are used to transmit the compressed data at rates up to, typically, 10 Mb/sec.

In order to serve a multitude of channel types, a preferred embodiment of the present invention includes a multitude of output ports of each type connected to one or more computers on the transmission and receiving system. The management of transmission is then distributed. That is, the computer controlling the transmission queue tells the transmission encoding computer its task and then the task is executed by the transmission encoding computer, independent of the transmission queue computer. The transmission queue computer provides the data for transmission by the file server which also distributes to other transmitters located in the same or other transmission encoding computers.

FIG. **5** is a flowchart of a preferred method of implementing a queue manager program of the present invention. The queue manager program, in the distribution process, preferably confirms availability of an item from the compressed data library **118** and logically connects the item stored in compressed data library **118** to the communications controller, illustrated in FIG. **2***a* (step **5010**). After availability is confirmed in step **5010**, the data awaits transmission by the transmitter **122**.

After availability is confirmed in step **5010**, the communications controller preferably makes the physical connection to the reception system **200** of the user (step **5020**). This is normally done by dialing the receiving device of the user. The reception system **200** preferably answers the incoming call and confirms the connection (step **5030**).

Once connected to the reception system **200**, in steps **5020** and **5030**, the data stored in compressed data library **118** is preferably transferred in data blocks from the compressed data library **118** to the communications controller (step **5040**). The data blocks are buffered by the communications controller. The buffered data is sent down the communications channel to the reception system **200** by transmitter **122** (step **5050**).

The transmitter **122** places the formatted data onto the communications channel. This is an electrical conversion section and the output depends upon the chosen communication path. The signal is sent to the reception system **200** in either a two way or a one way communication process. In a standard telephone connection, the transmitter **122** is preferably a modem. When using an ISDN channel, the transmitter **122** is preferably a data coupler.

In a preferred embodiment of the present invention, many forms of communication channels may be employed. Distribution of information is by common carrier communication channels whenever possible. These channels include common telephone service, ISDN and Broadband ISDN, DBS, cable television systems, microwave, and MAN.

In order that reception is performed efficiently, the reception system **200** confirms reception of the initial data block before receiving the remaining data blocks whenever possible (step **5060**). After all data blocks have been received and reception is confirmed, the communications controller breaks the physical connection to the reception system **200** (step **5070**). Then, confirmation of the transmission is sent to the queue manager (step **5080**). Finally, the queue manager updates the list and sends the information to the billing program, which updates the account of the user (step **5090**).

When item distribution occurs through a broadcasting method such as a communications satellite, the process is one way, with ongoing reception not being confirmed by the reception system **200**. In these situations, some further redundancy is included by transmission formatter **122** with the data blocks for error correction processing to be performed in the reception system **200**. In such one way communication situations, the queue manager program running in library system control computer **1123** confirms reception, via telephone line connection for example, to the reception system **200** after distribution. This should occur prior to updating the user's account and the dispatch lists.

The real time output signals are output to a playback system such as an audio amplifier and/or television. This output may also be sent to an audio/video recorder for more permanent storage. Moreover, in the preferred embodiment only non-copy protected data can be recorded on an audio/video recorder. Any material which is copy protected will be scrambled at the video output in a way which makes it viewable on a standard audio/video receiver but does not allow for recording of the material.

The reception system **200** has playback controls similar to the controls available on a standard audio/video recorder. These include: play, fast forward, rewind, stop, pause, and play slow. Since items are preferably stored on random access media, the fast forward and rewinding functions are simulations of the actual events which occur on a standard audio/video recorder. Frames do not tear as on an audio/video recorder, but in fast play modes they go by very quickly.

The library access interface **121** in the reception system **200** preferably includes a title window where a list of available titles are alphabetically listed. This window has two modes: local listing of material contained within the library system control computer **1123**, and library listing for all available titles which may be received from the available, remotely accessible libraries. The titles listed in this window are sent from the database on the library system control computer **1123** or the remote order processing and item database **300**.

The system may also preferably include dispatching control software which receives input from the remote order processing and item database **300** and sends distribution requests to the distribution systems. In instances where not all items are contained in each of the compressed data libraries **118**, the dispatching software will keep a list of the available titles in a particular compressed data library **118**. The dispatch software may also preferably coordinate network traffic, source material library **111** utilization, source material library **111** contents, and connection costs. By proper factoring of these variables, efficient use of the available distribution channels may be achieved.

FIG. **6** illustrates a block diagram of a preferred implementation of the reception system **200** according to the present invention. The reception system **200** is responsive to user requests for information stored in source material library **111**. The reception system **200** includes transceiver **201** which receives the audio and/or video information transmitted by transmitter **122** of the transmission system **100**. The transceiver **201** automatically receives the information from the transmitter **122** as compressed formatted data blocks.

The transceiver **201** is preferably connected to receiver format converter **202**. The receiver format converter **202** converts the compressed formatted data blocks into a format suitable for playback by the user in real time.

In the reception system **200** of the present invention, the user may want to play back the requested item from the source material library **111** at a time later than when initially requested. If that is the case, the compressed formatted data blocks from receiver format converter **202** are stored in storage **203**. Storage **203** allows for temporary storage of the requested item until playback is requested.

When playback is requested, the compressed formatted data blocks are sent ot data formatter **204**. Data formatter **204** processes the compressed formatted data blocks and distinguishes audio information from video information.

The separated audio and video information are respectively decompressed by audio decompressor **209** and video decompressor **208**. The decompressed video data is then sent simultaneously to converter **206** including digital video output converter **211** and analog video output converter **213**. The decompressed audio data is sent simultaneously to digital audio output converter **212** and analog audio output converter **214**. The outputs from converters **211–214** are produced in real time.

The real time output signals are output to a playback system such as a TV or audio amplifier. They may also be sent to an audio/video recorder of the user. By using the reception system **200** of the present invention, the user may utilize the stop, pause, and multiple viewing functions of the receiving device. Moreover, in a preferred embodiment of the present invention, the output format converters may be connected to a recorder which enables the user to record the requested item for future multiple playbacks.

FIG. **7** is a flow chart **400** of a preferred method of distribution of the present invention. The distribution method is preferably responsive to requests identifying information to be sent from the transmission system **100** to remote locations. Method **400** assumes that the items have already been stored in compressed data library **118**.

As illustrated in FIG. **7**, the first step of the distribution method **400** involves retrieving the information for selected items in the source material library **111**, upon a request by a user of the distribution system (step **412**). This is analogous to taking books off of a shelf at the local public library after the person has decided that he or she would like to read them.

After the information for the selected items is retrieved in step **412**, the distribution method **400** of the present invention further comprises the step of processing the information for efficient transfer (step **413**). The processing performed in step **413** preferably includes assigning a unique identification code to the retrieved information performed by identification encoder **112** shown and described with respect to FIG. **2***a* (step **413***a*). The processing also preferably includes placing

the retrieved information into a predetermined format as formatted data by converter **113** (step **413***b*), and placing the formatted data into a sequence of addressable data blocks by ordering means **114** (step **413***c*).

Processing step **413** also includes compressing the formatted and sequenced data performed by data compressor **116** (step **413***d*), and storing as a file the compressed sequenced data received from the data compression means with the unique identification assigned by the identification encoding means (step **413***e*).

After the information is processed for efficient transfer, in substeps **413***a–e* of step **413**, the distribution method **400** of the present invention preferably includes the step of storing the processed information is stored in a compressed data library (step **414**). Preferably, the compressed data library is analogous to compressed data library **118**, described with respect to FIG. **2***a*.

After the information is stored in a compressed data library **118**, the transmission and receiving system preferably waits to receive a transmission request (step **415**). Upon receiving a transmission request, from transmission system **100**, the compressed formatted data is preferably converted for output to a reception system **200**, selected by the user. The information is preferably transmitted over an existing communication channel to a reception system **200**, and is received by that system (step **417**). When the information is received in step **417**, it is preferably formatted for the particular type of reception system **200** to which the information is sent.

The received information is preferably buffered (step **418**) by a storage means analogous to element **203** shown in FIG. **3**. The information is preferably buffered so that it may be stored by the user for possible future viewings. The requested information is then payed back to the reception system **200** of the user at the time requested by the user (step **419**).

FIGS. **8***a–8e* are block diagrams of preferred implementations of data structures and data blocking for items in the audio and video distribution system. FIG. **8***a* shows the block structure of video data where a video frame **812** is composed of a plurality of video samples **811**, and a second of video **813** is composed of a plurality of video frames **812**.

FIG. **8***b* shows the block structure of audio data where an audio data frame **822** is composed of a plurality of audio sample **821**, and a second of audio **823** is composed of a plurality of audio data frames **822**. FIG. **8***c* shows the block structure of a data frame **832** composed of a plurality of data bytes **831**. The combination of the audio frames **812**, video frames **822**, and data frames **832** comprise the elements of a single item. FIG. **8***d* shows a block representation of for three illustrative items which may be stored in the source material library **111**. Each of items 1–3 contains its own arrangement of video frames **812**, audio frames **822**, and data frames **832**.

FIG. **8***e* shows methods of distribution to reception systems **200** with both mutiplexed and non-multiplexed signal paths, both addressed and non-addressed blocks of items. A block of an item may be an entire item or, alternatively, may be only a portion of an item, as selected by a user. Further, the blocks may be composed of either compressed, partially compressed, or fully decompressed data, as required by the configuration of the reception system **200**.

As shown in FIG. **8***e*, the same block, for example, block **1**, may be simultaneously transmitted over different distribution channels. The blocks when transmitted over one of the distribution channels may have receiver addresses appended to the blocks or the reception system **200** may have been preconfigured to receive the blocks comprising data frames for particular items from the active distribution channel.

Other embodiments of the invention will be apparent to those skilled in the art from consideration of the specification and practice of the invention disclosed herein. It is intended that the specification and examples be considered as exemplary only, with the true scope and spirit of the invention being indicated by the following claims.

What is claimed is:

1. A transmission system for providing information to be transmitted to remote locations, the transmission system comprising:

library means for storing items containing information; identification encoding means for retrieving the information in the items from the library means and for assigning a unique identification code to the retrieved information;

conversion means, coupled to the identification encoding means, for placing the retrieved information into a predetermined format as formatted data;

ordering means, coupled to the conversion means, for placing the formatted data into a sequence of addressable data blocks;

compression means, coupled to the ordering means, for compressing the formatted and sequenced data blocks;

compressed data storing means, coupled to the data compression means, for storing as files the compressed, sequenced data blocks received from the data compression means with the unique identification code assigned by the identification encoding means; and

transmitter means, coupled to the compressed data storing means, for sending at least a portion of one of the files to one of the remote locations.

2. A transmission system as recited in claim **1**, wherein the transmitter means includes:

transmission format means for placing the compressed, sequenced data blocks onto a communication path.

3. A transmission system as recited in claim **1**, wherein the information in the items includes analog signals, and wherein the conversion means further comprises:

converting means, coupled to the identification encoding means, for A/D converting the analog signals of the information into a series of digital bytes; and

formatting means, coupled to the converting means, for converting the series of digital data bytes into formatted data with a predetermined format.

4. A transmission system as recited in claim **1**, wherein the information in the items includes digital signals, and wherein the conversion means further comprises:

digital input receiver means, coupled to the identification encoding means, for converting the digital signals of the information into predetermined voltage levels; and

formatting means, coupled to the digital input receiver means, for converting the predetermined voltage levels into formatted data witha predetermined format.

5. A transmission system as recited in claim 3, wherein the information in the items includes digital signals, and wherein the conversion means further comprises:

digital input receiver means, coupled to the identification encoding means, for converting the digital signals of the information into predetermined voltage levels; and

voltage levels adjusting means, coupled to the digital input receiver means, for converting the predetermined voltage levels into formatted data with the predetermined format.

6. A transmission system as recited in claim 2, wherein the compressed data storing means further comprises:

compressed data library means for separately storing a plurality of files, each including at least one compressed, sequenced data block.

7. A transmission system as recited in claim 6, further comprising:

system control interface means, coupled to the transmission format means, for generating a listing of available items; and p1 library access interface means, coupled to the transmission format means, for receiving transmission requests to transmit items, and for retrieving formatted data blocks stored in the compressed data library means corresponding to the requests from subscribers.

8. A transmission system as recited in claim 1, further comprising:

precompression data processing means, coupled to the ordering means, for storing the formatted data blocks.

9. A transmission system as recited in claim 1, wherein the information in the items includes analog audio information, and wherein the conversion means further comprises:

audio converting means, coupled to the identification encoding means, for converting the analog audio signals into streams of digital audio data.

10. A transmission system as recited in one of claims 1 or 9, wherein the information in the items includes analog video information, and wherein the conversion means further comprises:

video converting means, coupled to the identification encoding means, for converting the analog video signals into streams of digital video data.

11. A transmission system as recited in one of claims 1 or 9, wherein the information in the items includes partially encoded information, and wherein the conversion means further comprises:

digital input means, coupled to the identification encoding means, for receiving partial encoded information in the items.

12. A transmission system as recited in claim 1, wherein the data compression means comprises:

means for performing a multi-channel analysis of the formatted data for inclusion in a predetermined algorithm; and

compression processors for running the predetermined algorithm and for compressing the formatted data.

13. A transmission system as recited in claim 1, wherein the compression means comprises:

means for identifying patterns in the formatted data for inclusion in a predetermined algorithm; and

compression processors for running the predetermined algorithm and for compressing the formatted data.

14. A transmission system as recited in claim 12, wherein the multi-dimensional analysis means includes means for performing the multi-dimensional analysis in the horizontal dimension.

15. A transmission system as recited in claim 12, wherein the multi-dimensional analysis means includes means for performing the multi-dimensional analysis in the vertical dimension.

16. A transmission system as recited in claim 12, wherein the multi-dimensional analysis means includes means for performing the multi-dimensional analysis in the time dimension.

17. A transmission system as recited in claim 12, wherein the multi-dimensional analysis means includes means for performing the multi-dimensional analysis in the zig-zag dimension.

18. A transmission system as recited in claim 1, wherein the information in the items includes digital signals, and wherein the conversion means further comprises formatting means for converting the digital signals of the information into formatted data with a predetermined format.

19. A distribution method responsive to requests from a user identifying items in a transmission system containing information to be sent from the transmission system to receiving systems at remote locations, the method comprising the steps of:

storing, in the transmission system, information from items in a compressed data form, the information including an identification code and being placed into ordered data blocks;

sending a request, by the user to the transmission system, for at least a part of the stored information to be transmitted to the one of the receiving systems at one of the remote location selected by the user;

sending at least a portion of the stored information from the transmission system to the receiving system at the selected remote location;

receiving the sent information by the receiving system at the selected remote location;

storing a complete copy of the received information in the receiving system at the selected remote location; and

playing back the stored copy of the information using the receiving system at the selected remote location at a time requested by the user.

20. The distribution method as recited in claim 19, wherein the information in the items includes analog and digital signals, and wherein the step of storing the information comprises the steps, performed by the transmission system, of:

converting the analog signals of the information to digital components;

formatting the digital signals of the information;

ordering the converted analog signals and the formatted digital signals into a sequence of addressable data blocks and;

compressing the ordered information.

21. The method of claim 19 wherein the step of storing the items includes the substep of

storing the items in a plurality of compressed audio and video libraries in the transmission system.

22. The method of claim 19 further comprising the steps, performed by the transmission system, of:

storing a list of items available to the user from at least one compressed data library; and

providing the user with the list so that the user may remotely select a particular item for transmission.

23. The distribution method as recited in claim 19, wherein the step of storing includes the step of storing the received information at the head end of a cable television reception system.

24. The distribution method as recited in claim 19, wherein the step of storing includes the step of storing the received information in an intermediate storage device.

25. A receiving system responsive to a user input identifying a choice of an item stored in a source material library at a transmission system to be played back to a user at a location remote from the source material library, the item containing information to be sent from the transmission system to the receiving system, the receiving system comprising:

requesting means for transmitting to the source material library in the transmission system the identity of the item;

transceiver means, coupled to the requesting means, for receiving the item from the transmission system as at least one compressed, formatted data block;

receiver format conversion means, coupled to the transceiver means, for converting the at least one compressed, formatted data block into a format suitable for storage processing, and for playback at the receiver system;

storage means, coupled to the receiver format conversion means, for storing a complete copy of the formatted data;

decompressing means, coupled to the storage means, for decompressing the copy of the formatted data; and

output data conversion means, coupled to the decompressing means, for playing back the decompressed copy of the data at a time specified by the user.

26. A receiving system as recited in claim 25, further comprising:

user interface means for translating the input into a request for sending the requested information from the transmitter to the receiving system.

27. A receiving system as recited in claim 25, wherein the output data conversion means includes recording means which controls the playback of the copy.

28. A receiving system as recited in claim 25, wherein the storage means stores the formatted information until playback is requested by an operator.

29. A receiving system as recited in claim 25, wherein the formatted data includes video information, and wherein the decompressing means further comprises:

video signal decompressing means for decompressing the video information contained in the formatted data.

30. A receiving system as recited in claim 29, wherein the output data conversion means further comprises:

digital video output means, connected to the video signal decompressing means, for outputting a digital video signal; and

analog video output means, connected to the video signal decompressing means, for outputting an analog video signal.

31. A receiving system as recited in claim 30, wherein the video output means further comprises:

copy protection means for preventing copying by the user of protected information.

32. A receiving system as recited in claim 25, wherein the formatted data includes audio information, and wherein the decompressing means further comprises:

audio signal decompressing means for decompressing the audio information contained in the formatted data.

33. A receiving system as recited in claim 32, wherein the output data conversion means further comprises:

digital audio output means, connected to the audio signal decompressing means, for outputting a digital audio signal; and

analog audio output means, connected to the audio signal decompressing means, for outputting an analog audio signal.

34. A receiving system as recited in claim 25, wherein the formatted data includes audio and video information, and wherein the decompressing means further comprises:

video signal decompressing means for decompressing the video information contained in the formatted data; and

audio signal decompressing means for decompressing the audio information contained in the formatted data.

35. A receiving system as recited in claim 25, wherein the transceiver means receives the information via any one of telephone, ISDN, broadband ISDN, satellite, common carrier, computer channels, cable television systems, MAN, and microwave.

36. A receiving system as recited in claim 25, wherein the source material library is a compressed data library.

37. A receiving system as recited in claim 29, wherein the output data conversion means further comprises digital video output means, connected to the video signal decompressing means, for outputting a digital video signal.

38. A receiving system as recited in claim 29, wherein the output data conversion means further comprises analog video output means, connected to the video signal decompressing means, for outputting an analog video signal.

39. A receiving system as recited in claim 32, wherein the output data conversion means further comprises digital audio output means, connected to the audio signal decompressing means, for outputting a digital audio signal.

40. A receiving system as recited in claim 32, wherein the output data conversion means further comprises analog audio output means, connected to the audio signal decompressing means, for outputting an analog audio signal.

41. A method of transmitting information to remote locations, the transmission method comprising the steps, performed by a transmission system, of:

storing items having information in a source material library;

retrieving the information in the items from the source material library;

assigning a unique identification code to the retrieved information;

placing the retrieved information into a predetermined format as formatted data;

placing the formatted data into a sequence of addressable data blocks;

compressing the formatted and sequenced data blocks;

storing, as a file, the compressed, formatted, and sequenced data blocks with the assigned unique identification code; and

sending at least a portion of the file to one of the remote locations.

42. A transmission method as recited in claim 41, wherein the step of placing further includes the steps of:

A/D converting analog signals of the retrieved information into a series of digital data bytes; and

converting the series of digital data bytes into formatted data with a predetermined format.

43. A transmission method as recited in claim 41, wherein the step of placing further includes the steps of:

converting digital signals of the retrieved information into predetermined voltage levels; and

converting the predetermined voltage levels into formatted data with a predetermined format.

44. A transmission method as recited in claim 41, wherein the step of placing further includes the step of converting digital signals of the retrieved information into formatted data with a predetermined format.

45. A transmission method as recited in claim 41, wherein the storing step further comprises the step of:

separately storing a plurality of files, each including compressed, sequenced data blocks.

46. A transmission method as recited in claim 45, further comprising the steps, performed by the transmission system, of:

generating a listing of available items;

receiving transmission requests to transmit available items; and

retrieving stored formatted data blocks corresponding to requests from users.

47. A distribution system including a transmission system and a plurality of receiving systems at remote locations, the transmission system being responsive to requests identifying items containing information to be sent from the transmission system to the receiving systems at the remote locations, the distribution system comprising:

storage means in the transmission system for storing information from the items in a compressed data form, in which the information includes an identification code and is placed into ordered data blocks;

requesting means in the transmission system, coupled to the storage means, for receiving requests from a user for at least a part of the stored information to be transmitted to the receiving system at one of the remote locations selected by the user;

transmission means in the transmission system, coupled to the requesting means, for sending at least a portion of the stored information to the receiving system at the selected remote location;

receiving means in the receiving system for receiving the transmitted information;

memory means in the receiving system, coupled to the receiving means, for storing a complete copy the received information; and

playback means in the receiving system, coupled to the memory means, for playing back the stored copy of the received information at a time requested by the user.

48. A distribution system as recited in claim 47, wherein the information in the items includes analog and digital signals, and wherein the storage means further comprises:

conversion means, for converting the analog signals of the information to digital components;

formatting means, coupled to the conversion means, for formatting the digital signals of the information;

ordering means, coupled to the formatting means, for ordering the converted analog signals and the formatted digital signals into a sequence of addressable data blocks and;

compression means, coupled to the ordering means, for compressing the ordered information.

49. A distribution system as recited in claim 47, wherein the memory means includes means for receiving information at the head end of a cable television reception system.

50. A distribution system as recited in claim 49, wherein the head end of the cable television reception system includes means for decompressing the received signals and distributing the decompressed received signals.

51. A distribution system as recited in claim 49, wherein the head end of the cable television reception system includes means for distributing compressed signals.

52. A distribution system as recited in claim 49, wherein the head end of the cable television reception system includes means for decompressing the received signals and for distributing the decompressed received signals and compressed received signals.

53. A distribution system as recited in claim 47, wherein the memory means is an intermediate storage device.

54. A method of receiving information at a receiving system from a transmission system which information is responsive to an input from a user, the input identifying a choice of an item stored in a source material library to be played back to the user at a receiving system at a location remote from the source material library, the item containing information to be sent from the transmission system to the receiving system, the receiving method comprising the steps of:

transmitting the identity of an item from the user to the source material library at the transmission system;

receiving at the receiving system the item from the transmission system as at least one compressed formatted data block;

converting, at the receiving system, the at least one compressed formatted data into a format suitable for storage processing and for playback in real time;

storing the converted information at the receiving system;

decompressing the stored information at the receiving system; and

playing back, at the receiving system, the decompressed information at a time specified by the user.

55. A receiving method, as recited in claim 54, wherein the decompressing step further includes the step of decompressing video information contained in the stored information.

56. A receiving method as recited in claim 54, wherein the decompressing step further includes the step of decompressing audio information contained in the stored information.

57. A receiving method as recited in claim 54, wherein the decompressing step further includes the steps of:

decompressing video information contained in the stored information; and

decompressing audio information contained in the stored information.

58. a receiving method as recited in claim 54, wherein the step of transmitting further includes the step of transmitting to a compressed data library the identity of an item.

* * * * *

UNITED STATES PATENT AND TRADEMARK OFFICE

CERTIFICATE OF CORRECTION

PATENT NO. : 5,132,992
DATED : July 21, 1992
INVENTOR(S) : Paul Yurt et al.

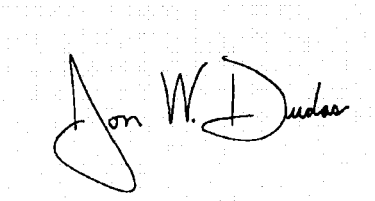
It is certified that error appears in the above-identified patent and that said Letters Patent is hereby corrected as shown below:

Column 23,
Line 42, after "the" insert -- user --;

Column 25,
Line 56, after "copy" insert -- of --.

Signed and Sealed this

Nineteenth Day of October, 2004



JON W. DUDAS
Director of the United States Patent and Trademark Office

UNITED STATES PATENT AND TRADEMARK OFFICE

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PATENT NO. : 5,132,992
DATED : July 21, 1992
INVENTOR(S) : Paul Yurt et al.

It is certified that error appears in the above-identified patent and that said Letters Patent is hereby corrected as shown below:

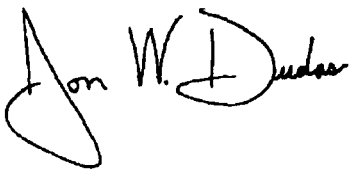
Column 20,
Line 67, "witha" should be -- with a --;

Column 21,
Line 23, delete "p1";
Line 58, "multi-channel" should be -- multi-dimensional --;

Column 26,
Line 64, "a" should be -- A --.

Signed and Sealed this

Eleventh Day of January, 2005



JON W. DUDAS
Director of the United States Patent and Trademark Office

EXHIBIT

10

US006144702A

United States Patent [19]

Yurt et al.

[11] Patent Number: 6,144,702

[45] Date of Patent: *Nov. 7, 2000

[54] **AUDIO AND VIDEO TRANSMISSION AND RECEIVING SYSTEM**

[75] Inventors: **Paul Yurt**, Scottsdale, Ariz.; **H. Lee Browne**, Greenwich, Conn.

[73] Assignee: **Greenwich Information Technologies, LLC**, Greenwich, Conn.

[*] Notice: This patent is subject to a terminal disclaimer.

[21] Appl. No.: **09/120,452**

[22] Filed: **Jul. 23, 1998**

Related U.S. Application Data

[62] Division of application No. 08/630,590, Apr. 10, 1996, Pat. No. 6,002,720, which is a continuation of application No. 08/133,982, Oct. 8, 1993, Pat. No. 5,550,863, which is a continuation of application No. 07/862,508, Apr. 2, 1992, Pat. No. 5,253,275, which is a continuation of application No. 07/637,562, Jan. 7, 1991, Pat. No. 5,132,992.

[51] **Int. Cl.**[7] **H04N 7/12**

[52] **U.S. Cl.** **375/240.01**; 375/377; 348/384.1

[58] **Field of Search** 375/240, 377, 375/240.01; 455/4.1, 4.2, 5.1, 5.2, 6.3; 348/6, 7, 8, 10, 12, 13, 17, 423, 384, 384.1

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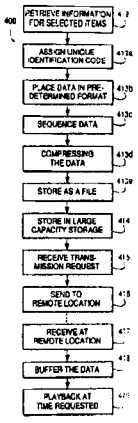
Primary Examiner—Amanda T. Le

Attorney, Agent, or Firm—Howrey Simon Arnold & White, LLP

[57] **ABSTRACT**

A system of distributing video and/or audio information employs digital signal processing to achieve high rates of data compression. The compressed and encoded audio and/or video information is sent over standard telephone, cable or satellite broadcast channels to a receiver specified by a subscriber of the service, preferably in less than real time, for later playback and optional recording on standard audio and/or video tape.

42 Claims, 12 Drawing Sheets



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5,995,705	11/1999	Lang .	

FIG. 1a

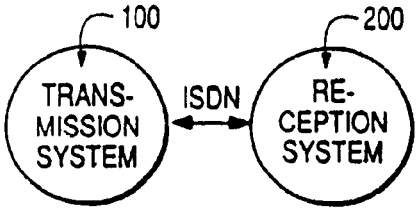


FIG. 1b

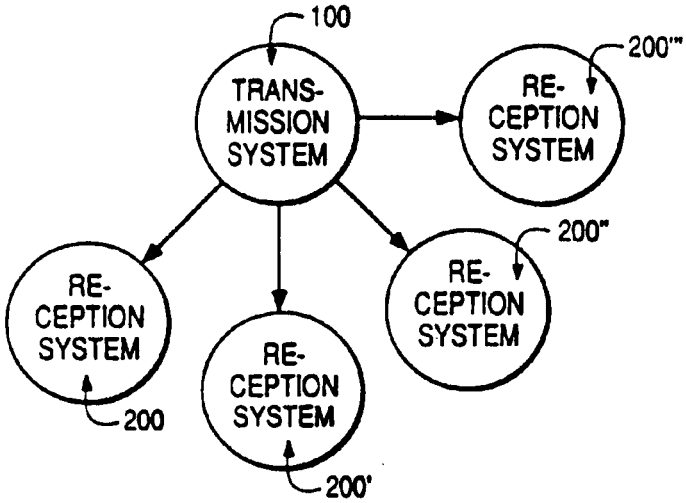
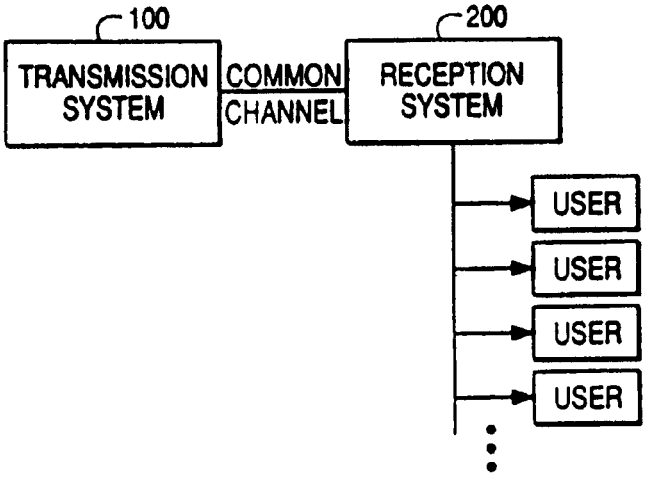


FIG. 1d



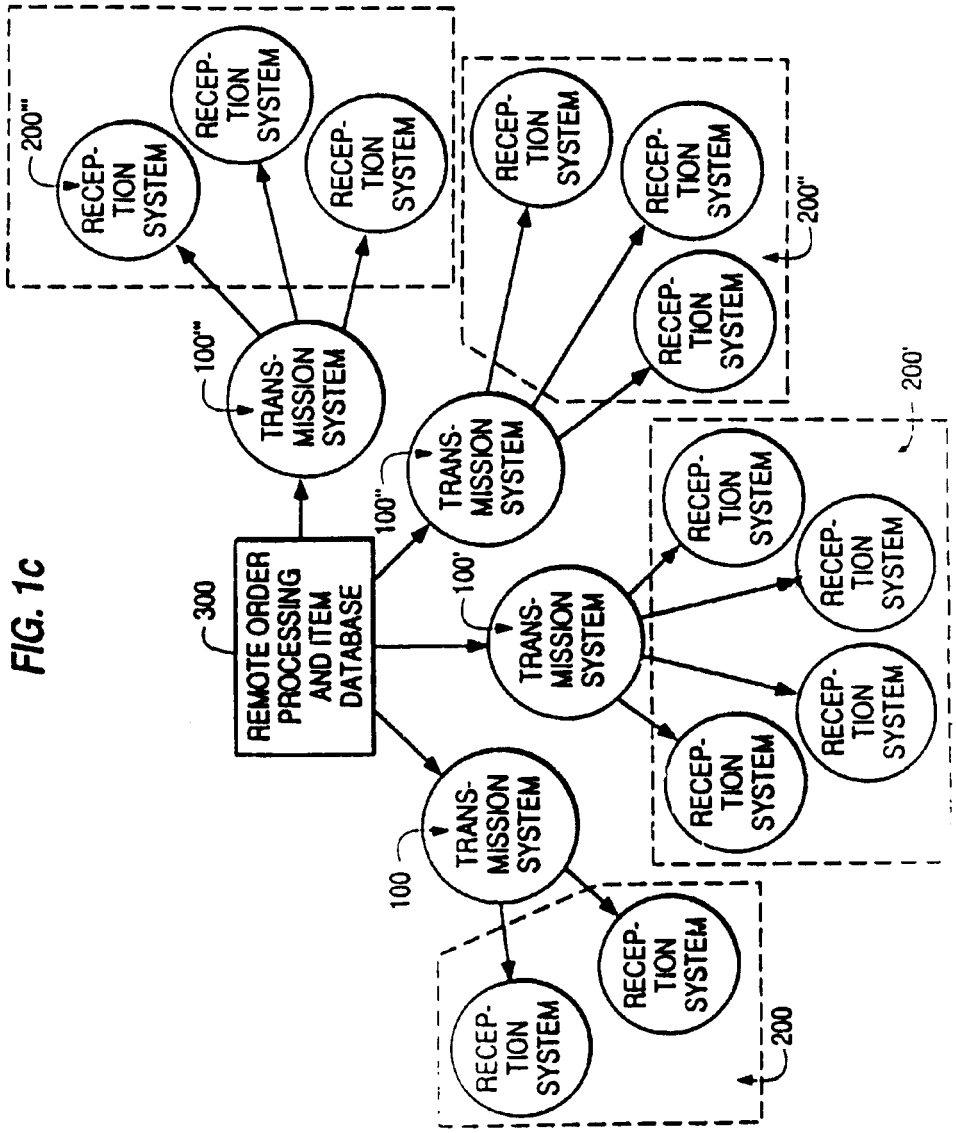

REMOTE ORDER PROCESSING AND ITEM DATABASE
300
TRANS-MISSION SYSTEM
100
100'
100"
100'''
RECEP-TION SYSTEM
200
200'
200"
200'''

FIG. 1c

FIG. 1e

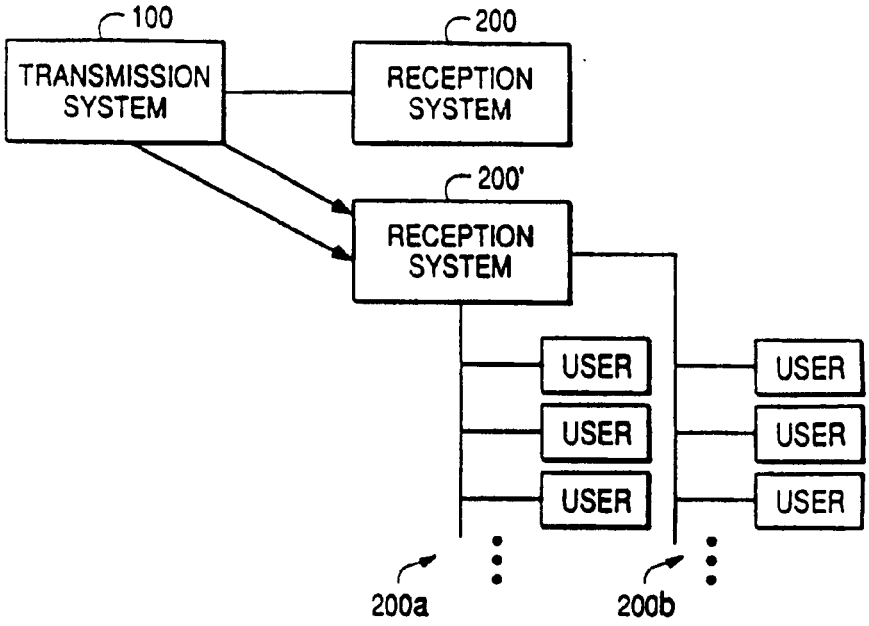

100
TRANSMISSION SYSTEM
200
RECEPTION SYSTEM
200'
RECEPTION SYSTEM
USER
USER
USER
USER
USER
USER
200a
200b

FIG. 1f

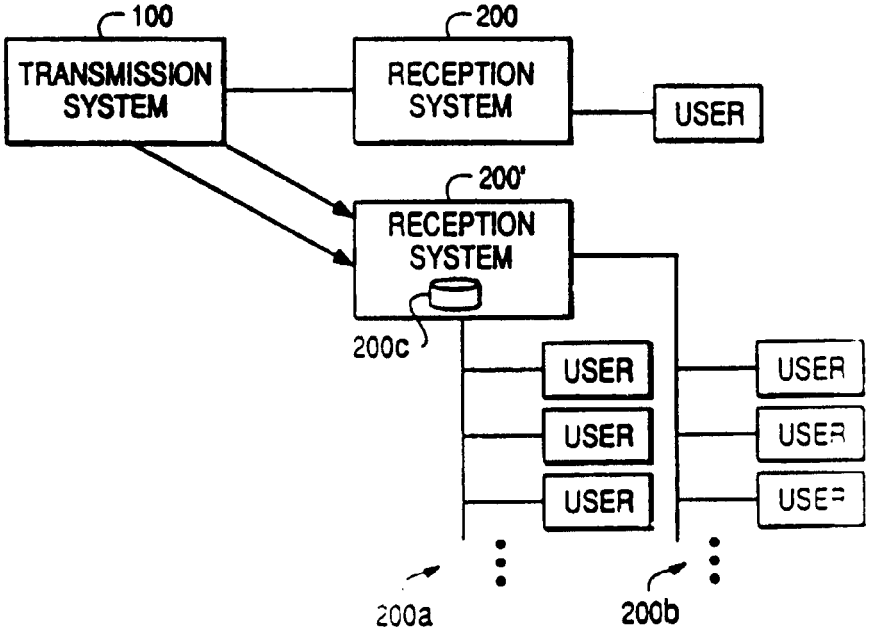

100
TRANSMISSION SYSTEM
200
RECEPTION SYSTEM
USER
200'
RECEPTION SYSTEM
200c
USER
USER
USER
USER
USER
USER
200a
200b

FIG. 1g

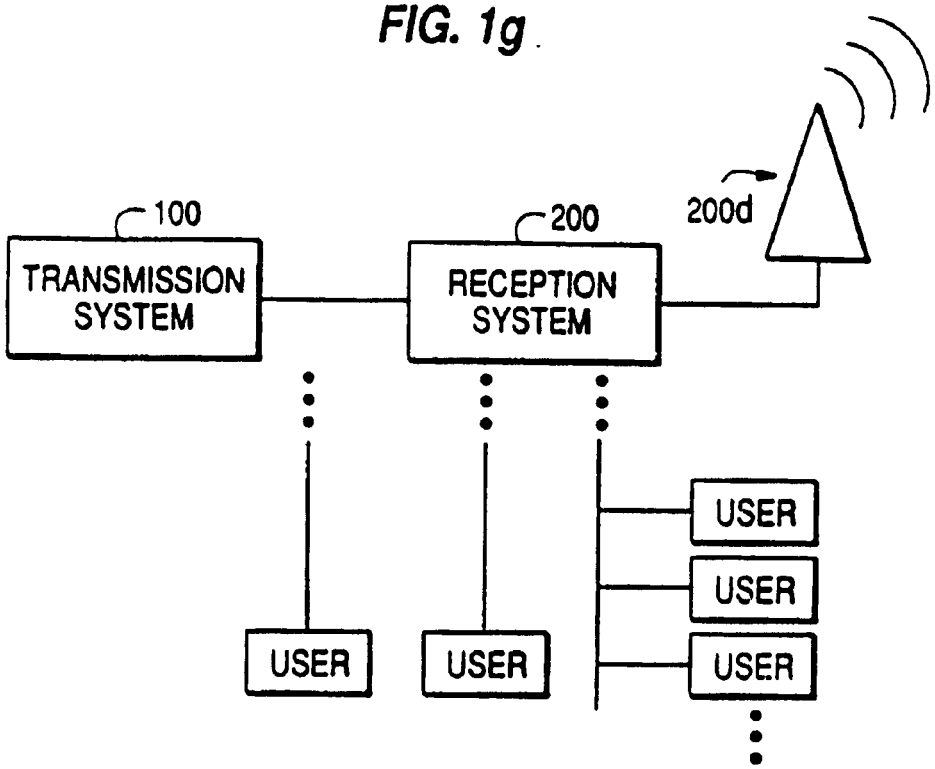
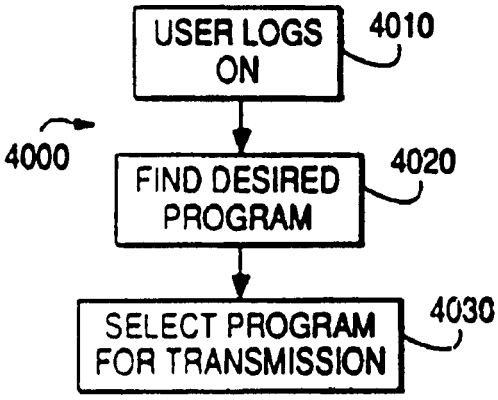

100
TRANSMISSION SYSTEM
200
RECEPTION SYSTEM
200d
USER
USER
USER
USER
USER
USER

FIG. 4


USER LOGS ON
4010
4000
FIND DESIRED PROGRAM
4020
SELECT PROGRAM FOR TRANSMISSION
4030

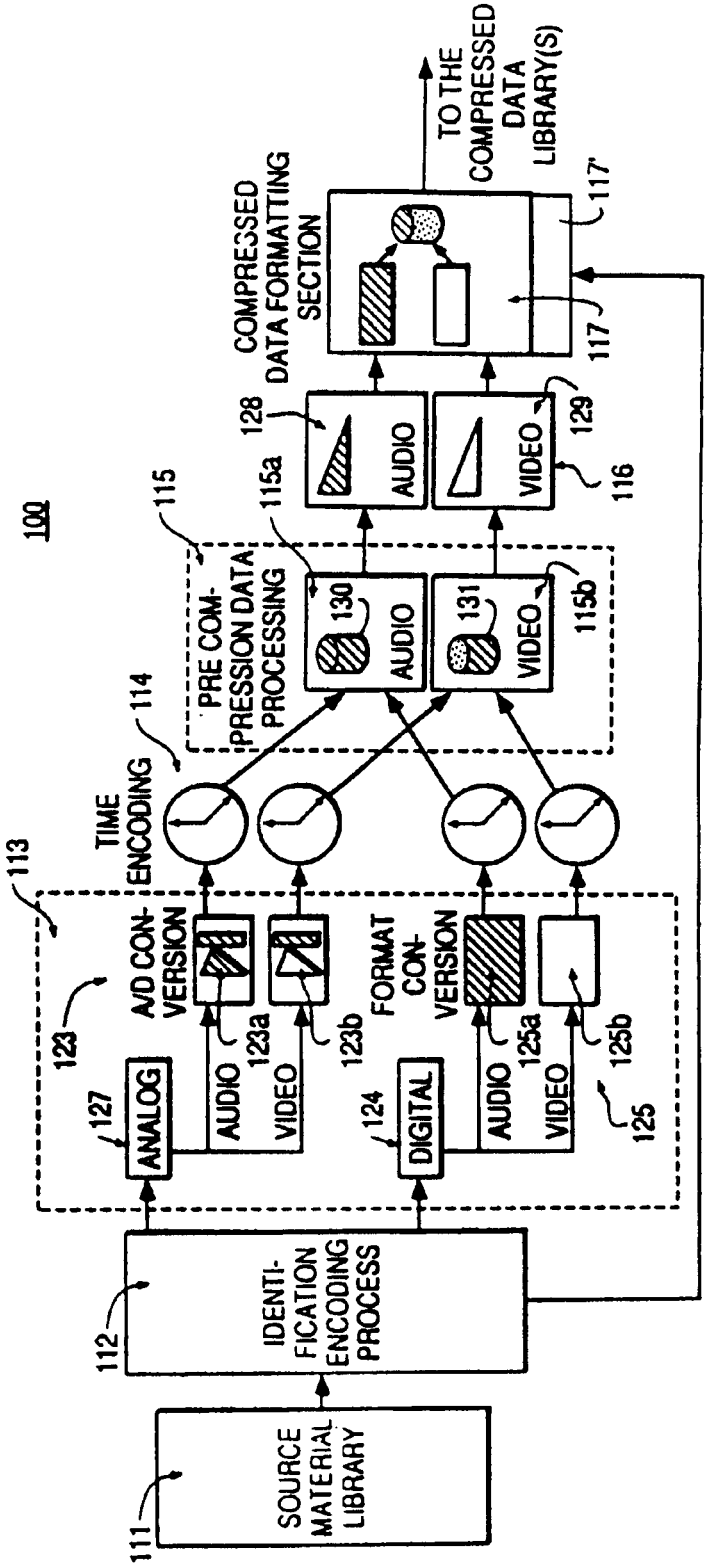

100
111
SOURCE MATERIAL LIBRARY
112
IDENTI-FICATION ENCODING PROCESS
113
TIME ENCODING
114
A/D CON-VERSION
123
123a
123b
FORMAT CON-VERSION
125a
125b
125
127
ANALOG
AUDIO
VIDEO
124
DIGITAL
AUDIO
VIDEO
PRE COM-PRESSION DATA PROCESSING
115
115a
115b
130
AUDIO
131
VIDEO
128
AUDIO
129
VIDEO
116
COMPRESSED DATA FORMATTING SECTION
117
117'
TO THE COMPRESSED DATA LIBRARY(S)

FIG. 2a

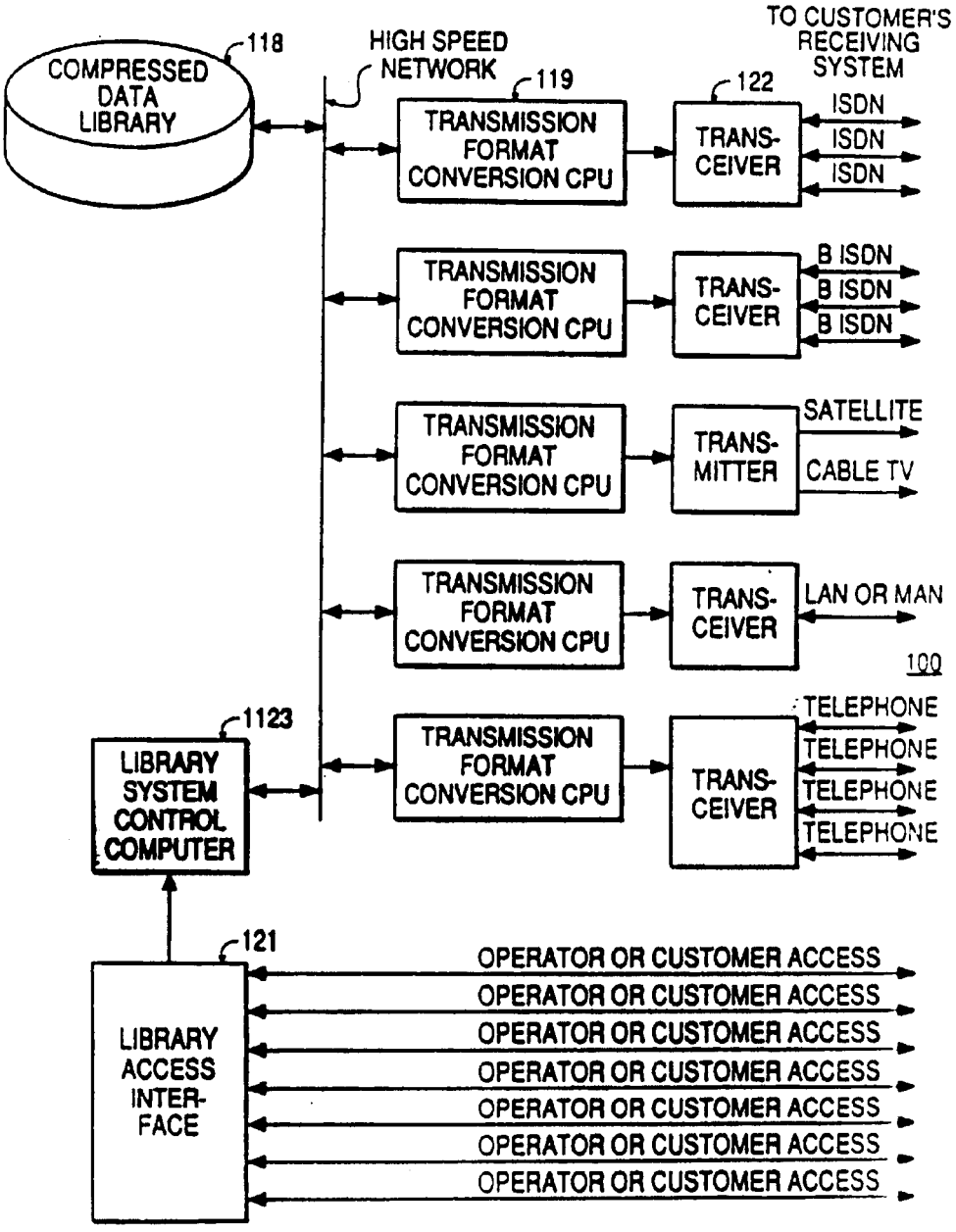

COMPRESSED DATA LIBRARY
118
HIGH SPEED NETWORK
119
TRANSMISSION FORMAT CONVERSION CPU
TRANS-CEIVER
122
TO CUSTOMER'S RECEIVING SYSTEM
ISDN
ISDN
ISDN
TRANSMISSION FORMAT CONVERSION CPU
TRANS-CEIVER
B ISDN
B ISDN
B ISDN
TRANSMISSION FORMAT CONVERSION CPU
TRANS-MITTER
SATELLITE
CABLE TV
TRANSMISSION FORMAT CONVERSION CPU
TRANS-CEIVER
LAN OR MAN
100
1123
LIBRARY SYSTEM CONTROL COMPUTER
TRANSMISSION FORMAT CONVERSION CPU
TRANS-CEIVER
TELEPHONE
TELEPHONE
TELEPHONE
TELEPHONE
121
LIBRARY ACCESS INTER-FACE
OPERATOR OR CUSTOMER ACCESS
OPERATOR OR CUSTOMER ACCESS
OPERATOR OR CUSTOMER ACCESS
OPERATOR OR CUSTOMER ACCESS
OPERATOR OR CUSTOMER ACCESS
OPERATOR OR CUSTOMER ACCESS
OPERATOR OR CUSTOMER ACCESS

FIG. 2b

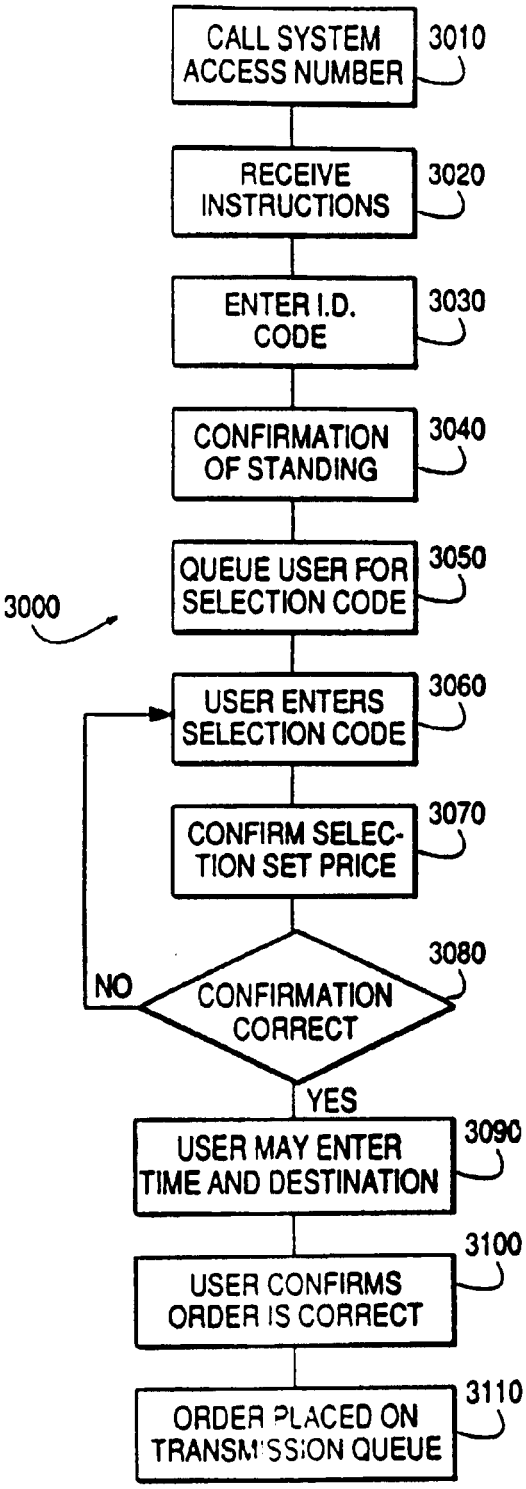

CALL SYSTEM ACCESS NUMBER
3010
RECEIVE INSTRUCTIONS
3020
ENTER I.D. CODE
3030
CONFIRMATION OF STANDING
3040
QUEUE USER FOR SELECTION CODE
3050
3000
USER ENTERS SELECTION CODE
3060
CONFIRM SELECTION SET PRICE
3070
CONFIRMATION CORRECT
3080
NO
YES
USER MAY ENTER TIME AND DESTINATION
3090
USER CONFIRMS ORDER IS CORRECT
3100
ORDER PLACED ON TRANSMISSION QUEUE
3110

FIG. 3

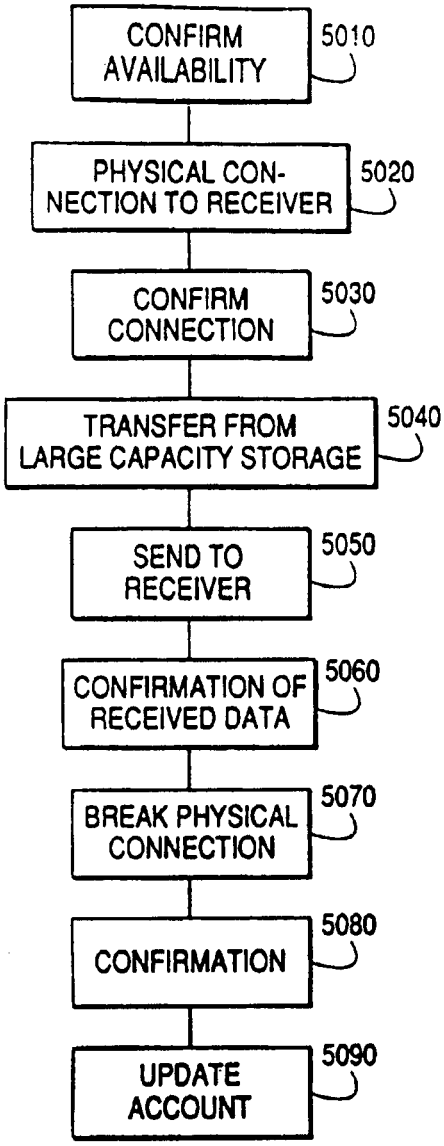

CONFIRM AVAILABILITY
5010
PHYSICAL CONNECTION TO RECEIVER
5020
CONFIRM CONNECTION
5030
TRANSFER FROM LARGE CAPACITY STORAGE
5040
SEND TO RECEIVER
5050
CONFIRMATION OF RECEIVED DATA
5060
BREAK PHYSICAL CONNECTION
5070
CONFIRMATION
5080
UPDATE ACCOUNT
5090

FIG. 5

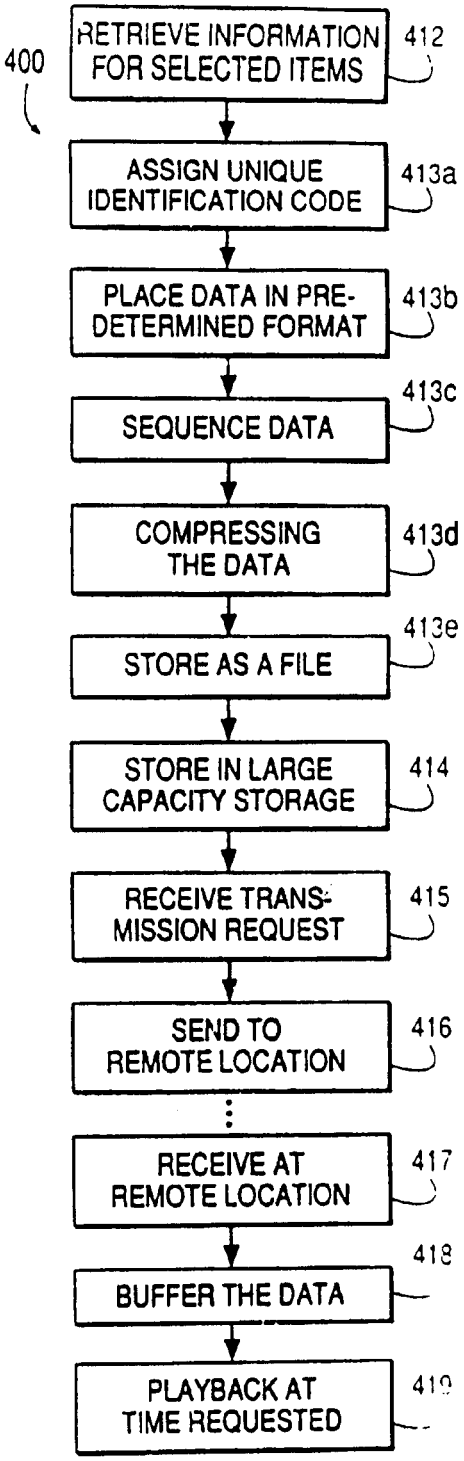

400
RETRIEVE INFORMATION FOR SELECTED ITEMS
412
ASSIGN UNIQUE IDENTIFICATION CODE
413a
PLACE DATA IN PRE-DETERMINED FORMAT
413b
SEQUENCE DATA
413c
COMPRESSING THE DATA
413d
STORE AS A FILE
413e
STORE IN LARGE CAPACITY STORAGE
414
RECEIVE TRANSMISSION REQUEST
415
SEND TO REMOTE LOCATION
416
RECEIVE AT REMOTE LOCATION
417
BUFFER THE DATA
418
PLAYBACK AT TIME REQUESTED
419

FIG. 7

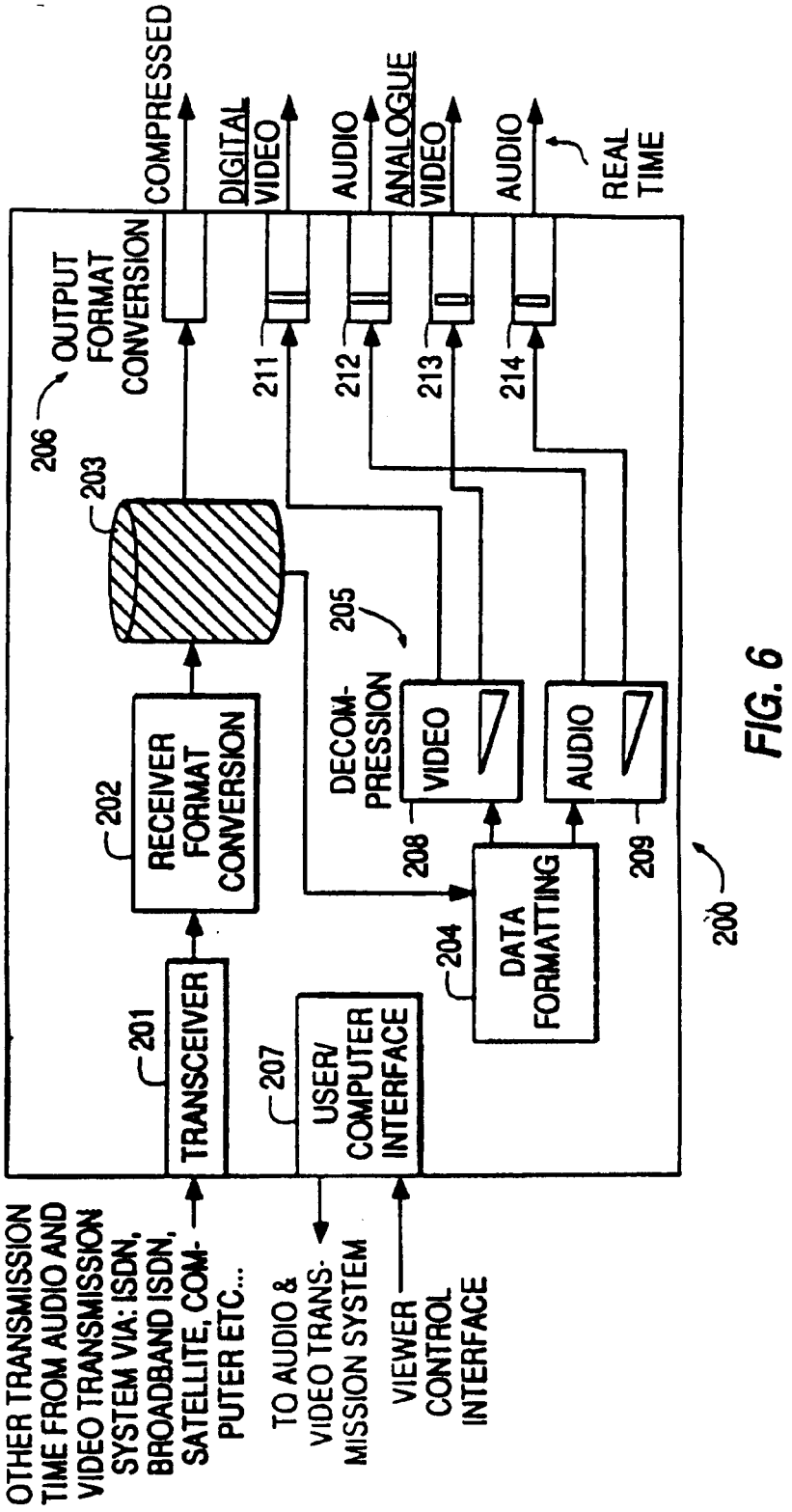

OTHER TRANSMISSION TIME FROM AUDIO AND VIDEO TRANSMISSION SYSTEM VIA: ISDN, BROADBAND ISDN, SATELLITE, COMPUTER ETC...
TO AUDIO & VIDEO TRANSMISSION SYSTEM
VIEWER CONTROL INTERFACE
TRANSCEIVER
201
USER/ COMPUTER INTERFACE
207
RECEIVER FORMAT CONVERSION
202
DATA FORMATTING
204
DECOMPRESSION
205
VIDEO
208
AUDIO
209
200
OUTPUT FORMAT CONVERSION
206
203
211
212
213
214
COMPRESSED
DIGITAL VIDEO
AUDIO
ANALOGUE VIDEO
AUDIO
REAL TIME

FIG. 6

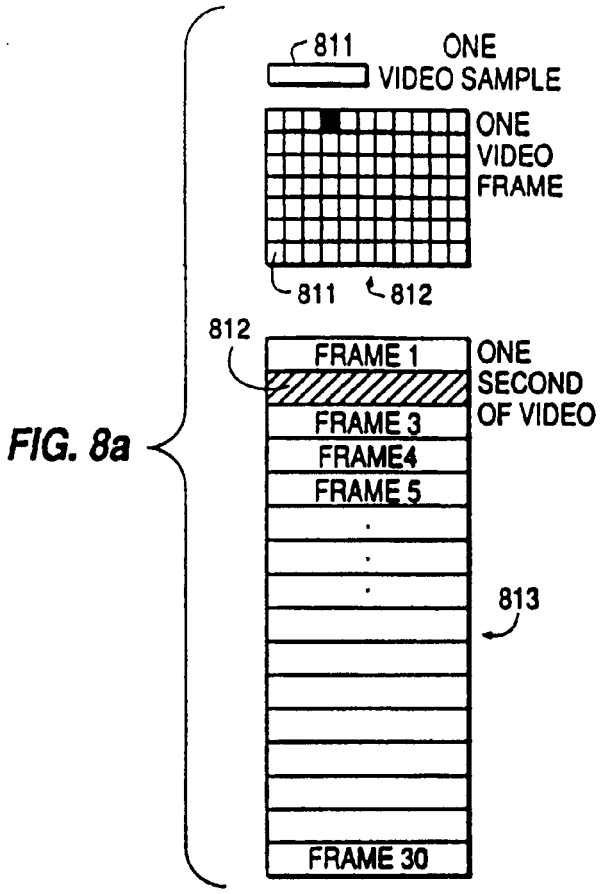

811
ONE
VIDEO SAMPLE
ONE
VIDEO
FRAME
811
812
812
FRAME 1
ONE
SECOND
OF VIDEO
FRAME 3
FRAME4
FRAME 5
813
FRAME 30

FIG. 8a

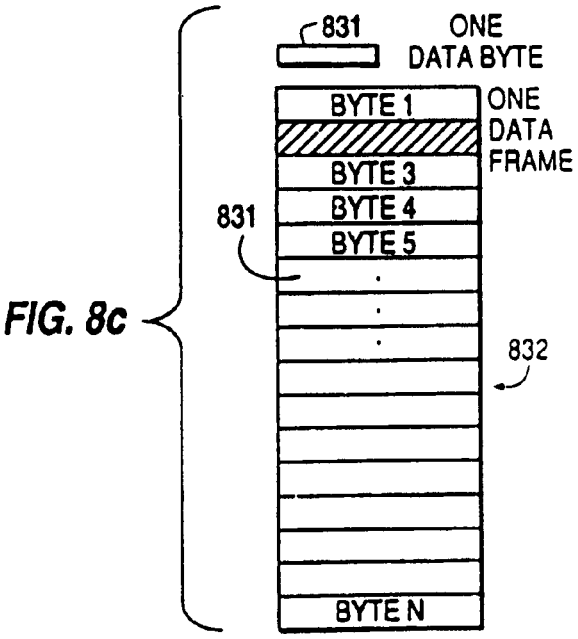

831
ONE
DATA BYTE
BYTE 1
ONE
DATA
FRAME
BYTE 3
BYTE 4
831
BYTE 5
832
BYTE N

FIG. 8c

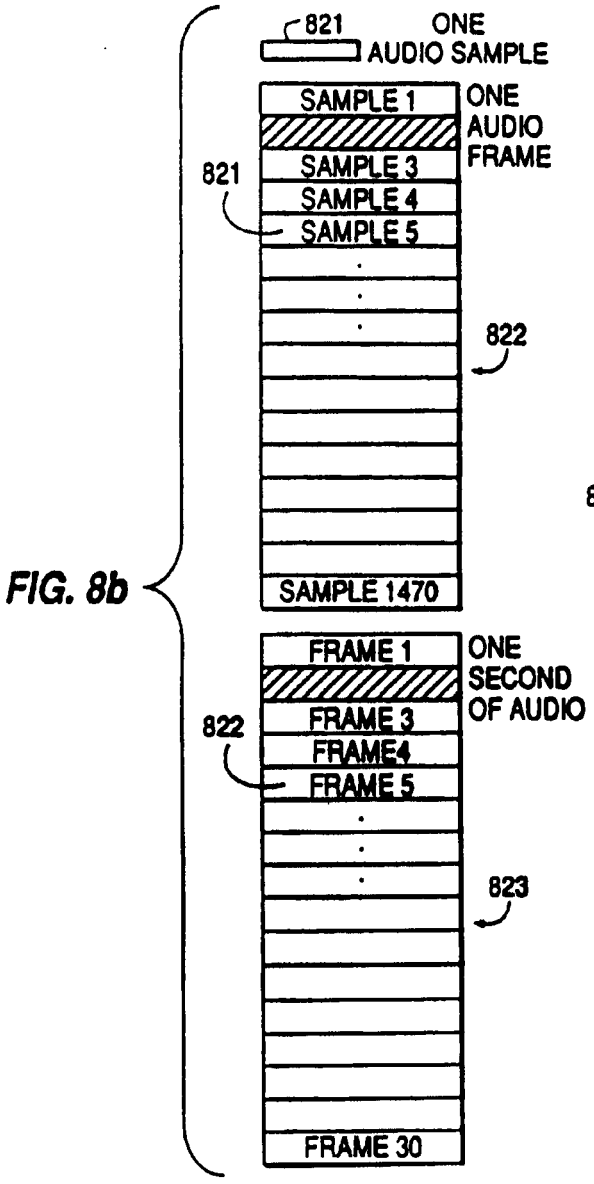

821
ONE AUDIO SAMPLE
SAMPLE 1
SAMPLE 3
SAMPLE 4
SAMPLE 5
SAMPLE 1470
ONE AUDIO FRAME
821
822
FRAME 1
FRAME 3
FRAME4
FRAME 5
FRAME 30
ONE SECOND OF AUDIO
822
823

FIG. 8b

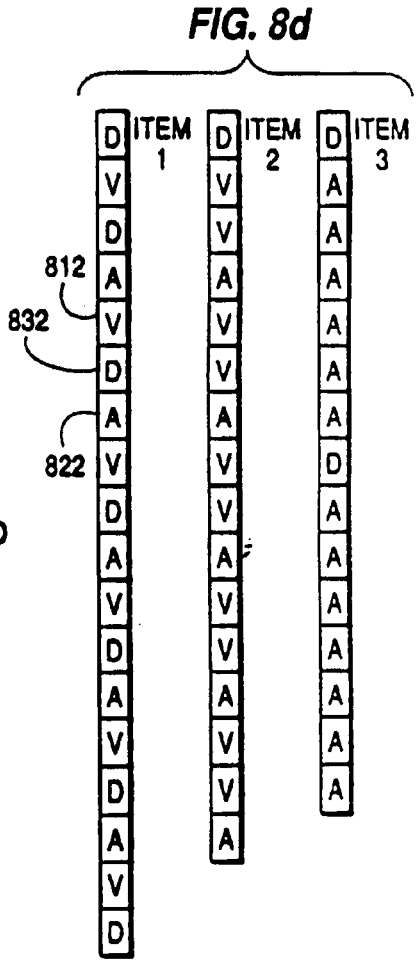

ITEM 1
ITEM 2
ITEM 3
812
832
822

FIG. 8d

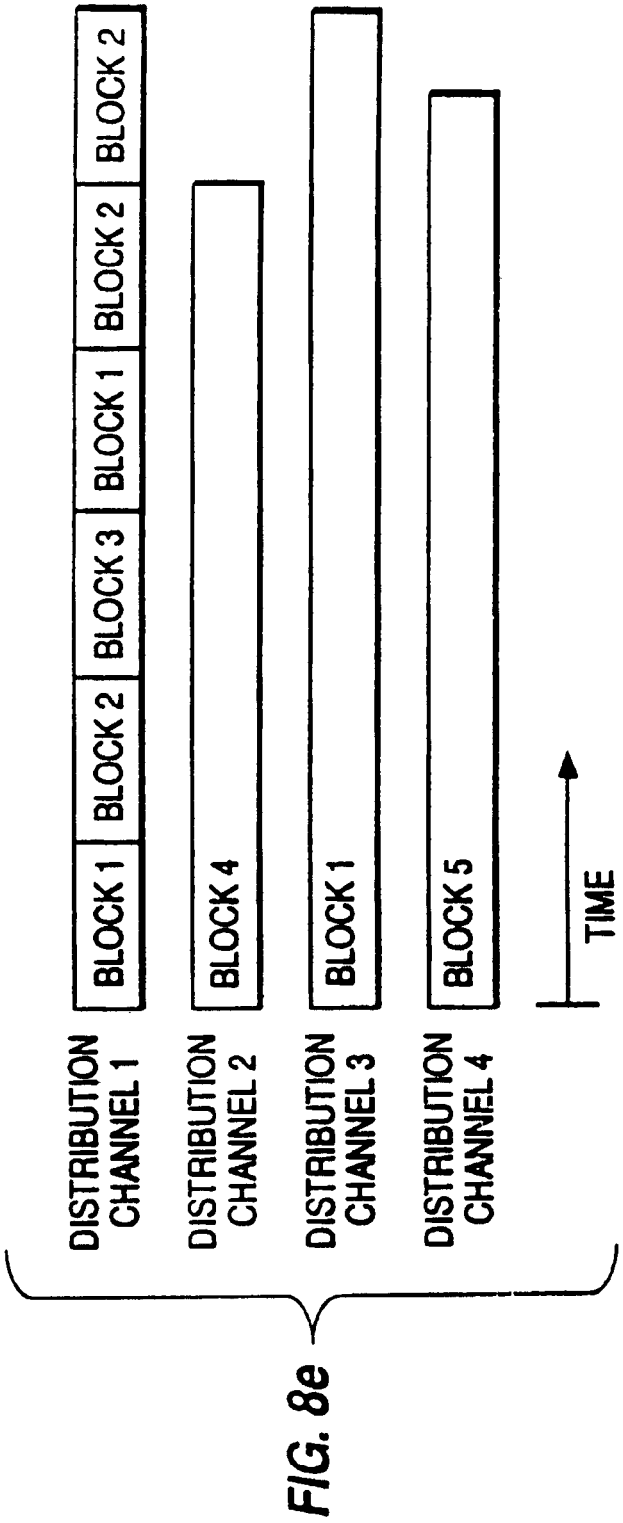

BLOCK 1
BLOCK 2
BLOCK 3
BLOCK 1
BLOCK 2
BLOCK 2
BLOCK 4
BLOCK 1
BLOCK 5
TIME
DISTRIBUTION CHANNEL 1
DISTRIBUTION CHANNEL 2
DISTRIBUTION CHANNEL 3
DISTRIBUTION CHANNEL 4

FIG. 8e

AUDIO AND VIDEO TRANSMISSION AND RECEIVING SYSTEM

This is a division of application Ser. No. 08/630,590, filed Apr. 10, 1996, which issued as U.S. Pat. No. 6,002,720, which is a continuation of application Ser. No. 08/133,982, filed Oct. 8, 1993, which issued as U.S. Pat. No. 5,550,863, which is a continuation of application Ser. No. 07/862,508, filed Apr. 2, 1992, which issued as U.S. Pat. No. 5,253,275, which is a continuation application of Ser. No. 07/637,562, filed Jan. 7, 1991, which issued as U.S. Pat. No. 5,132,992, which applications are hereby incorporated herein by reference.

BACKGROUND OF THE INVENTION

The present invention relates generally to an audio and video transmission and receiving system, and more specifically to such a system in which the user controls the access and the playback operations of selected material.

At the present time, only a video cassette recorder (VCR) or a laser disk player (LDP) allow a viewer to enjoy control over selection of particular audio/video material. Using either a VCR or an LDP requires the viewer to obtain a video tape either by rental or by purchase. Remote accessing of the material has not yet been integrated into an efficient system.

Several designs have been developed which provide the viewer with more convenient means of accessing material. One such design is disclosed in U.S. Pat. No. 4,506,387, issued to Walter. The Walter patent discloses a fully dedicated, multi-conductor, optical cable system that is wired to the viewer's premises. While the system affords the viewer some control over accessing the material, it requires that a location designated by the viewer by wired with a dedicated cable. The Walter system further requires the viewer be at that location for both ordering and viewing the audio/video material.

U.S. Pat. No. 4,890,320, issued to Monslow, describes a system which broadcasts viewer selected material to a viewer at a prescribed time. This system is limited in that it requires multiple viewers in multiple locations to view the audio/video material at the time it is broadcast, rather than allowing each viewer to choose his or her own viewing time. The system disclosed in Monslow also does not allow for the stop, pause, and multiple viewing functions of existing VCR technology.

U.S. Pat. No. 4,590,516, issued to Abraham, discloses a system that uses a dedicated signal path, rather than multiple common carriers, to transmit audio/video programming. The receiver has no storage capability. The system provides for only display functions, which limits viewing to the time at which the material is ordered. Like Monslow, the Abraham system does not allow for the stop, pause, and multiple viewing functions of existing VCR technology.

U.S. Pat. No. 4,963,995, issued to Lang, discloses an audio/video transceiver with the capability of editing and/or copying from one video tape to another using only a single tape deck. Lang does not disclose a system with one or more libraries wherein a plurality of system subscribers may access information stored in the film and tape library or libraries, and play back the selected information at a time and place selected by the subscriber.

It is therefore an object of the present invention to provide a user with the capability of accessing audio/video material by integrating both accessing and playback controls into a system that can use multiple existing communications channels.

It is a further object of the present invention to provide a picture and sound transmission system which allows the user to remotely select audio/video material from any location that has either telephone service or a computer.

A still further object of the present invention is to provide a picture and sound transmission system wherein the selected audio/video material is sent over any one of several existing communication channels in a fraction of real time to any location chosen by the user that has a specified receiver.

Another object of the present invention is to provide a picture an sound transmission system wherein the user may play back the selected audio/video material at any time selected by the user and retain a copy of the audio/video material for multiple playbacks in the future.

Another object of the present invention is to provide a picture and sound transmission system wherein the information requested by the user may be sent as only audio information, only video information, or as a combination of audio and video information.

Additional objects and advantages of the invention will be set forth in the description which follows, and in part will be obvious from the description, or may be learned by practice of the invention. The objects and advantages of the invention may be realized and obtained by means of the instrumentalities and combinations particularly pointed out in the appended claims.

SUMMARY OF THE INVENTION

To achieve the objects in accordance with the purposes of the present invention, as embodied and described herein, the transmission and receiving system for providing information to remote locations comprises source material library means prior to identification and compression; identification encoding means for retrieving the information for the items from the source material library means and for assigning a unique identification code to the retrieved information; conversion means, coupled to identification encoding means, for placing the retrieved information into a predetermined format as formatted data; ordering means, coupled to the conversion means, for placing the formatted data into a sequence of addressable data blocks; compression means, coupled to the ordering means, for compressing the formatted and sequenced data; compressed data storing means, coupled to the compression means, for storing as a file the compressed sequenced data received from the compression means with the unique identification code assigned by the identification encoding means; and transmitter means, coupled to the compressed data storing means, for sending at least a portion of a specific file to a specific one of the remote locations.

The present invention further comprises a distribution method responsive to requests identifying information to be sent from a transmission system to a remote location, the method comprising the steps of storing audio and video information in a compressed data form; requesting transmission, by a user, of at least a part of the stored compressed information to the remote location; sending at least a portion of the stored compressed information to the remote location; receiving the sent information at the remote location; buffering the processed information at the remote location; and playing back the buffered information in real time at a time requested by the user.

Additionally, the present invention comprises a receiving system responsive to a user input identifying a choice of an item stored in a source material library to be played back to the subscriber at a location remote from the source material library, the item containing information to be sent from a

transmitter to the receiving system, and wherein the receiving system comprises transceiver means for automatically receiving the requested information from the transmitter as compressed formatted data blocks; receiver format conversion means, coupled to the transceiver means, for converting the compressed formatted data blocks into a format suitable for storage and processing resulting in playback in real time; storage means, coupled to the receiver format conversion means, for holding the compressed formatted data; decompressing means, coupled to the receiver format conversion means, for decompressing the compressed formatted information; and output data conversion means, coupled to the decompressing means, for playing back the decompressed information in real time at a time specified by the user.

BRIEF DESCRIPTION OF THE DRAWINGS

The accompanying drawings, which are incorporated in and constitute a part of the specification, illustrate the presently preferred apparatus and method of the invention and, together with the general description given above and the detailed description of the preferred embodiment given below serve to explain the principles of the invention. In the drawings:

FIGS. **1***a*–**1***g* are high level block diagrams showing different configurations of the transmission and receiving system of the present invention;

FIGS. **2***a* and **2***b* are detailed block diagrams of preferred implementation of the transmission system of the present invention;

FIG. **3** is a flowchart of a preferred method of ordering a selection from a library in accordance with the present invention;

FIG. **4** is a flowchart of a preferred method of user request via a user interface of the present invention;

FIG. **5** is a flowchart of a preferred method of implementing a queue manager program of the present invention;

FIG. **6** is a block diagram of a preferred implementation of the receiving system of the present invention;

FIG. **7** is a flowchart of a preferred method of distribution of the present invention; and

FIGS. **8***a*–**8***e* are block diagrams of preferred implementations of data structures and data blocking for items in the audio and video distribution system of the present invention.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

FIGS. **1***a*–**1***g* are high level block diagrams showing different configurations of the transmission and receiving system of the present invention. FIGS. **1***a*, **1***b*, **1***d*, **1***e*, **1***f*, and **1***g* each show transmission system **100**, described in more detail below with respect to FIGS. **2***a* and **2***b*. A user of the transmission and receiving system of the present invention preferably accesses transmission system **100** by calling a phone number or by typing commands into a computer. The user then chooses audio and/or video material from a list of available items which he or she wants to listen to and/or watch.

As shown in FIG. **1***a*, the transmission and receiving system may preferably comprise a peer to peer configuration where one transmission system **100** communicates with one reception system **200**. As shown in FIG. **1***b*, the transmission and receiving system of the present invention may alternatively comprise a plurality of reception systems **200**, **200'**, **200"**, and **200'"**, which are each associated with a single transmission system **100**.

FIG. **1***c* shows a high level block diagram of the transmission and receiving system of the present invention including remote order processing and item database **300**, described in more detail with respect to FIG. **3**. Remote order processing and item database **300** preferably enables users to access desired items by remote communication. The remote order processing and item database **300** may communicate with a plurality of transmission systems **100**, **100'**, **100"**, and **100'"**, each of which communicates with a respective set of reception systems **200**, **200'**, **200"**, and **200'"**. Each of the reception systems in sets **200**, **200'**, **200"**, and **200'"** may preferably communicate with a plurality of users.

FIG. **1***d* shows a high level block diagram of the transmission and receiving system of the present invention including a transmission system **100** distributing to a plurality of users via a reception system **200** configured as a cable television system.

FIG. **1***e* shows a high level block diagram of the transmission and receiving system of the present invention including a transmission system **100** distributing to a plurality reception systems **200** and **200'**. In the configuration shown in FIG. **1***e*, reception system **200** is a direct connection system wherein a user is directly connected to transmission system **100**. Reception system **200'** preferably includes a first cable television system **200***a* and a second cable television system **200***b*. Users of cable television systems **200***a* and **200***b* are indirectly connected to transmission system **100**.

FIG. **1***f* shows a high level block diagram of the transmission and receiving system of the present invention including transmission system **100** distributing via several channels to reception systems **200** and **200'**. Reception system **200** is preferably non-buffering. In such a system, users are directly connected to transmission system **100**, as in reception system **200** in FIG. **1***e*.

Reception system **200'** shown in FIG. **1***f* is a cable television system, as shown in reception system **200'** of FIG. **1***e*. In FIG. **1***f*, the reception system **200'** is preferably buffering, which means that users may receive requested material at a delayed time. The material is buffered in intermediate storage device **200***c* in reception system **200'**.

In the configuration of FIG. **1***f*, decompression of the requested material may preferably occur at the head end of a cable television reception system **200'**. Thus, distribution may be provided to users via standard television encoding methods downstream of the head end of the cable distribution system. This method is preferred for users who only have cable television decoders and standard television receivers.

FIG. **1***g* shows a high level block diagram of the transmission and receiving system of the present invention including transmission system **100** distributing to a reception system **200**, which then preferably transmits requested material over airwave communication channels **200***d*, to a plurality of users. The transmission and receiving system shown in FIG. **1***g* may preferably transmit either compressed or uncompressed data, depending on the requirements and existing equipment of the user. The airwave transmission and receiving system shown in FIG. **1***g* may preferably employ either VHF, UHF or satellite broadcasting systems.

With respect to the transmission and receiving systems set forth in FIGS. **1***a*–**1***g*, the requested material may be fully compressed and encoded, partly decompressed at some stage in transmission system **100**, or fully decompressed prior to transmission. The reception systems **200** may either buffer the requested material for later viewing, or decom-

press in real time the requested material as it is distributed by transmission system **100**. Alternatively, the reception systems **200** of the present invention may perform a combination of buffering and non-buffering by buffering some of the requested material and decompressing the remainder of the requested material for immediate viewing as it is distributed by transmission system **100**.

In direct connection configurations, such as reception systems **200** shown in FIGS. **1***e* and **1***f*, the user preferably selects the reception system **200** to which the requested material is sent, and optionally selects the time playback of the requested material as desired. Accordingly, the user may remotely access the transmission system **100** from a location different than the location of reception system **200** where the material will be sent and/or played back. Thus, for example, a user may preferably call transmission system **100** from work and have a movie sent to their house to be played back after dinner or at any later time of their choosing.

In non-direct connection reception systems such as shown in reception system **200'** of FIG. **1***f*, intermediate storage device **200***c* may preferably include, for example, sixteen hours of random access internal audio and video storage. A reception system with such storage is capable of storing several requested items for future playback. The user could then view and/or record a copy of the decompressed requested material in real time, or compressed in non-real time, at a time of their choosing. Accordingly, the user would not have to make a trip to the store to purchase or rent the requested material.

In any of the transmission and receiving systems illustrated in FIGS. **1***a*–**1***g*, the requested material may be copy protected. To achieve copy protection, the requested material, as an item, is encoded as copy protected during storage encoding in transmission system **100**. The user may then play back the item only one time. The user may also optionally review select portions of the item prior to its automatic erasure from the memory of the reception system **200**. In this way, requested material may be distributed to "view only" users and also to "view and copy" users who wish to retain copies of the distributed items.

Copy protected programs, when decompressed and played back, would have a copy protection technique applied to the analog and digital output signals. The analog video output is protected from copying through the use of irregular sync signals, which makes the signal viewable on a standard television but not recordable on a audio/video recorder. The receiving system recognizes copy protected programs and disables the audio-video recorder. Digital output protection is effected through copy protect bit settings in the digital output signal, thus preventing a compatible digital recorder from recording the digital audio and/or video signal stream. A protected item will not be passed to the compressed data port of the digital recorder for off line storage.

FIGS. **2***a* and **2***b* illustrate detailed block diagrams of preferred implementations of the transmission system **100** of the present invention. Transmission system **100** may either be located in one facility or may be spread over a plurality of facilities. A preferred embodiment of transmission system **100** may preferably include only some of the elements shown in FIGS. **2***a* and **2***b*.

Transmission system **100** of a preferred embodiment of the present invention preferably includes source material library means for temporary storage of items prior to conversion and storage in a compressed data library means. The items of information may include analog and digital audio and video information as well as physical objects such as books and records which require conversion to a compatible media type before converting, compressing and storing their audio and video data in the compressed data library means.

As shown in FIG. **2***a*, the source material library means included in transmission system **100** preferably includes a source material library **111**. The source material library **111** may include different types of materials including television programs, movies, audio recordings, still pictures, files, books, computer tapes, computer disks, documents of various sorts, musical instruments, and other physical objects. These materials are converted to or recorded on a media format compatible to the digital and analog inputs of the system prior to being compressed and stored in a compressed data library **118**. The different media formats preferably include digital or analog audio and video tapes, laser disks, film images, optical disks, magnetic disks, computer tapes, disks and, cartridges.

The source material library **111**, according to a preferred embodiment of the present invention, may preferably include a single source material library or a plurality of source material libraries. If there are a plurality of source material libraries, they may be geographically located close together or may be located far apart. The plurality of source material libraries may communicate using methods and channels similar to the methods and channel types which libraries may employ for communication with the receiving system **200** of the user, or the source material libraries may communicate via any available method.

Prior to being made accessible to a user of the transmission and receiving system of the present invention, the item must be stored in at least one compressed data library **118**, and given a unique identification code by identification encoder **112**. Storage encoding, performed by identification encoder **112**, aside form giving the item a unique identification code, optionally involves logging details about the item, called program notes, and assigning the item a popularity code. Storage encoding may be performed just prior to conversion of the item for transmission to reception system **200**, at any time after starting the conversion process, or after storing the item in the compressed data library **118**.

In a preferred embodiment of the present invention, the method of encoding the information involves assigning a unique identification code and a file address to the item, assigning a popularity code, and inputting the program notes. This process is identical for any of the different media types stored in the source material library **111**.

The transmission system **100** of the present invention also preferably includes conversion means **113** for placing the items from source material library **111** into a predetermined format as formatted data. In the preferred embodiment, after identification encoding is performed by identification encoder **112**, the retrieved information is placed into a predetermined format as formatted data by the converter **113**. The items stored in source material library **11** and encoded by identification encoder **112** may be in either analog or digital form. Converter **113** therefore includes analog input receiver **127** and digital input receiver **124**. If items have only one format, only one type of input receiver **124** or **127** is necessary.

When the information from identification encoder **112** is digital, the digital signal is input to the digital input receiver **124** where it is converted to a proper voltage. A formatter **125** sets the correct bit rates and encodes into least significant bit (lsb) first pulse code modulated (pcm) data. Formatter **125** includes digital audio formatter **125***a* and digital

video formatter **125***b*. The digital audio information is input into a digital audio formatter **125***a* and the digital video information, if any, is input into digital video formatter **125***b*. Formatter **125** outputs the data in a predetermined format.

When the retrieved information from identification encoder **112** is analog, the information is input to an analog-to-digital converter **123** to convert the analog data of the retrieved information into a series of digital data bytes. Converter **123** preferably forms the digital data bytes into the same format as the output of formatter **125**.

Converter **123** preferably includes an analog audio converter **123***a* and an analog video converter **123***b*. The analog audio converter **123***a* preferably converts the retrieved audio signal into pcm data samples at a fixed sampling rate. The analog video converter **123***b* preferably converts the analog video information, retrieved from identification encoder **123**, into pcm data also at fixed sampling rates.

If the retrieved information being converted contains only audio information, then the audio signal is fed to the appropriate digital audio input or analog audio input. When the retrieved information contains both audio and video information, the audio and video signals are passed simultaneously to the audio and video converter inputs. Synchronization between the audio and video data can be maintained in this way.

If, for example, the retrieved information to be converted from the source material library **111** is a motion picture film, the picture frames in the film are passed through a digital telecine device to the digital input receiver **124**. Format conversion is then preferably performed by digital video formatter **125***b*. Accompanying audio information is passed through an optical or magnetic digital playback device. This device is connected to digital audio formatter **125***a*.

In some cases, such as in inter-library transfers, incoming materials may be in a previously compressed form so that there is no need to perform compression by precompression processor **115** and compressors **128** and **129**. In such a case, retrieved items are passed directly from identification encoder **112** to the compressed data formatter **117**. The item database records, such as the program notes which may also be input from another system, to the compressed data formatting section **117**, where this data, if necessary, is reformatted to make it compatible with the material stored in compressed data library **118**. Such material may be received in the form of digital tapes or via existing communication channels and may preferably input directly to a short term storage **117'** in the compressed data formatting section **117**.

The transmission system **100** of the present invention also preferably includes ordering means for placing the formatted information into a sequence of addressable data blocks. As shown in FIG. **2***a*, the ordering means in the preferred embodiment includes time encoder **114**. After the retrieved information is converted and formatted by the converter **113**, the information may be time encoded by the time encoder **114**. Time encoder **114** places the blocks of converted formatted information from converter **113** into a group of addressable blocks. The preferred addressing scheme employs time encoding. Time encoding allows realignment of the audio and video information in the compressed data formatting section **117** after separate audio and video compression processing by precompression processor **115** and compressor **116**.

The converted formatted information of the requested material is then preferably in the form of a series of digital data bytes which represent frames of video data and samples of the audio data. A preferred relationship of the audio and video bytes to each other is shown in FIG. **8**. Incoming signals are input and converted in sequence, starting with the first and ending with the last frame of the video data, and starting with the first and ending with the last sample of the audio data. Time encoding by time encoder **114** is achieved by assigning relative time markers to the audio and video data as it passes from the converter **113** through the time encoder **114** to the precompression processor **115**. Realignment of audio and video data, system addressing of particular data byes, and user addressing of particular portions of items are all made possible through time encoding.

Through the use of the address of an item and its frame number it is possible to address any particular block of audio or video data desired. From here, further addressing down to the individual byte is possible. Frames and groups of frames may preferably be further broken down, as necessary to the individual bytes and bits, as required for certain processing within the system.

User and system addressing requirements dictate the level of granularity available to any particular section of the system. Users are able to move through data in various modes, thus moving through frame addresses at various rates. For example, a user may desire to listen to a particular song. They may preferably enter the song number either when requesting the item from the compressed data library **118** and only have that song sent to their receiving system **200** or they may preferably select that particular song from the items buffered in their receiving system **200**. Internal to the system, the song is associated with a starting frame number, which was indexed by the system operator via the storage encoding process. The system item database may contain information records for individual frames or groups of frames. These can represent still frames, chapters, songs, book pages, etc. The frames are a subset of, and are contained within, the items stored in the compressed data library **118**. Time encoding by time encoder **114** makes items and subsets of items retrievable and addressable throughout the transmission system **100**. Time encoding enables subsequent compression of the information to be improved because data reduction processes may be performed in the time dimension. This is described in greater detail below.

The transmission system **100** of the present invention also preferably includes data compression means for compressing the formatted and sequenced data. The sequence of addressable data blocks which was time encoded and output by time encoder **114** is preferably sent to precompression processor **115**. The data arriving from time encoder **114** may be at various frame rates and of various formats. Precompression processor **115** preferably includes audio precompressor **115***a* and video precompressor **115***b*.

Video precompression processor **115***b* buffers incoming video data and converts the aspect ratio and frame rate of the data, as required by compression processor **116**. The frame buffer **131** of video precompression processor **115***b* holds all incoming data until the data is compressed by the data compressor **116**. The incoming video data is processed for sample rate optimization, aspect ratio fitting and buffered in buffer **130** for compression processing by the video precompression processor **115***b*.

Video precompression processor **115***b* processes the incoming video data so that it fits into the aspect ratio of the transmission and receiving system of the present invention. When incoming material with a different aspect ratio than the aspect ratio of the system is selected, a chosen background is preferably placed around the inactive region of the

video information. In this way, no data is lost to differences in the aspect ratio between incoming material, and the converted and compressed data stored in the transmission system **100**. Images resulting from a different aspect ratio may have an inactive region where background information is contained, or may be converted into a best fit arrangement. Output from the video precompression processor **115***b* is stored in the frame buffer **131**, which is dual ported and is directly addressable by video compressor **129**.

The incoming audio data is processed for sample rate and word length optimization and is then buffered in buffer **130** for compression processing by the audio precompression processor **115***a*. Audio precompression processor **115***a* may preferably transcode incoming audio information, as required, to create the optimum sample rate and word lengths for compression processing. The output of the audio precompression processor **115***a* is a constant sample rate signal of a fixed word length which is buffered in frame buffer **130**. The frame buffer **130** is dual ported and is directly addressable by audio compressor **128**. Blocking the audio data into frames at audio precompression processor **115***a* makes it possible to work with the audio data as addressable packets of information.

Once precompression processing is finished, the frames are compressed by the data processor **116**. Compressor **116** preferably comprises an audio data compressor **128** and a video data compressor **129**. The benefits of data compression performed by data compressor **116** are shortened transmission time, faster access time, greater storage capacity, and smaller storage space requirements. Compression processing performed by compressors **128** and **129** requires multiple samples of data to perform optimum compression. Audio and video information is preferably converted into blocks of data organized in groups for compression processing by audio compressor **128** and video compressor **129**, respectively. These blocks are organized as frames, and a number of frames are contained respectively in the buffers **130** and **131**. By analyzing a series of frames it is possible to optimize the compression process.

Audio data is preferably compressed by audio compressor **128** by application of an adaptive differential pulse code modulation (ADPCM) process to the audio data. This compression process, which may be implemented by the apt-x 100 digital audio compression system, is manufactured by Audio Processing Technology (APT). Audio compression ratios of 8× or greater are achieved with the APT system.

Compression by compressor **116** may be performed on a group of 24 video frames may preferably be passed in sequence to the frame buffer **130** of the video precompression processor **115***b* where they are analyzed by video compressor **129** which performs data reduction processing on the video data. Video compression is preferably performed by video compressor **129**. Video compression is achieved by the use of processors running algorithms designed to provide the greatest amount of data compression possible. Video data compression preferably involves applying two processes: a discrete cosine transform, and motion compensation. This process is described in "A Chip Set Core of Image Compression", by Artieri and Colavin. Multiple frames of video data may preferably be analyzed for patterns in the horizontal (H), vertical (V), diagonal (zigzag) and time (Z) axis. By finding repetition in the video data, redundancy may be removed and the video data may be compressed with a minimal loss of information.

In accordance with a preferred embodiment of the present invention, the transmission system **100** may further comprise compressed data storing means, coupled to the compression means, for storing as a file the compressed sequenced data with the unique identification code received from the data compression means. After compression processing by compressor **116**, the compressed audio and video data is preferably formatted and placed into a single file by the compressed data storage means **117**. The file may contain the compressed audio and/or video data, time markers, and the program notes. The file is addressable through the unique identification code assigned to the data by the identification encoder **112**.

Further, according to the present invention, the transmission system preferably includes compressed data library means for separately storing composite formatted data blocks for each of the files. The compressed data storage means preferably includes compressed data library **118**, as shown in FIG. **2***b*. After the data is processed into a file by the compressed data storage means **117**, it is preferably stored in a compressed data library **118**. In a preferred embodiment, compressed data library **118** is a network of mass storage devices connected together via a high speed network. Access to any of the files stored in compressed data library **118** is available from multiple reception systems **200** connected to the transmission and receiving system.

Stored items are preferably accessed in compressed data library **118** through a unique address code. The unique address code is a file address for uniquely identifying the compressed data items stored in the compressed data library section of a library system. This file address, combined with the frame number, and the library system address allow for complete addressability of all items stored in one or more compressed data libraries **118**. Compressed data library addresses along with receiving system addresses are used to form a completely unique address for distribution system control.

The unique address code is an address assigned to the item by the system operator during storage encoding, which is preferably done prior to long term storage in the compressed data library **118**. In a preferred embodiment, the unique address code is used for requesting and accessing information and items throughout the transmission and receiving system. The unique address code makes access to the requested data possible.

The storage encoding process performed by encoder **112** also allows entry of item notes and production credits. Production credits may include the title, names of the creators of the item such as the producer, director, actors, etc. Other details regarding the item which may be of interest and which may make the items more accessible are kept in an item database.

Item addresses are mapped to item names by identification encoder **112** and may preferably be used as an alternative method of accessing items. The item names are easier to remember, thus making user access more intuitive by using item names. The storage encoding entry process performed in identification encoder **112** operates a program which updates a master item database containing facts regarding items in the compressed data library system. The storage encoding process may be run by the system operator whereby the system operator accesses the master item database to track and describe items stored in one or more compressed data libraries. The names and other facts in the item database may preferably be updated at any time via the storage encoding process. Changes made to the master item database may be periodically sent to the remote order processing and item database **300**.

As described in more detail later, a user may preferably access an item via its unique identification code, via its title, or the user may use other known facts for accessing an item. The user may access items in the compressed data library **118** directly using the unique address code or he user may obtain access via the remote order processing and item database **300**. Indirect access via the remote order processing and item database **300** is possible using, for example, a synthesized voice system, a query type of computer program interface, or customer assistance operators. In addition to providing interactive access to the remote order processing and item database **300**, a catalog listing some or all available titles may also preferably be published. With a published catalog, users may obtain the unique address code for an item very easily thereby allowing for retrieval from the compressed data library **118** without any help from an interactive system.

To achieve user access via an interactive system, facts about the items may be kept in files as a part of the items or the facts may be kept separately, for example, by systems which only inform users of the available items and take orders. For example, in systems which have portions split in separate locations, the facts about the items may be separated from the items themselves and stored in separate files. A system of this type can distribute user orders to other portions of the transmission and receiving system for ultimate distribution to the requesting user. Further, to support a plurality of users, multiple versions of the item database may preferably reside either on multiple database servers, in catalogs, or on other computer systems.

The item database master may reside in the system control computer **1123** where may be updated and kept current to the content of the compressed data library **118**. The data stored in the item database master may be accessed by users via application programs, running on the system control computer **1123**, and on the reception system **200** of the user. Users may connect to he item database via any available telecommunication channels. Copies of the item database master may be updated and informed of new entries into compressed data library **118** at periodic intervals determined by the system manager.

Other copies of the item database master may also be made available to users from the remote order processing and item database **300** which batch processes and downloads user requests to the control computer **1123** of the compressed data library **118** via standard telecommunications or high speed communication channels. Moreover, multiple remote order processing and item database **300** sites make it possible for more locations to process orders than there are library facilities, and thus make order processing more efficient.

Preferably, access of a requested item via the remote order processing and item database **300** operates as follows. If the user does not know the title of the desired item, he or she may request the item by naming other unique facts related to the item. For example, a user would be able to access an item about Tibetan Medicine by asking for all items which include information about "Tibet" and include information about "Medicine." The remote order processing and item database **300** would then be searched for all records matching this request. If there is more than one item with a match, each of the names of the matching items are preferably indicated to the user. The user then selects the item or items that he or she desires. Upon selection and confirmation, by the user, a request for transmission of a particular item or items is sent to the distribution manager program of the system control computer **1123**. The request contains the address of the user, the address of the item, and optionally includes specific frame numbers, and a desired viewing time of the item.

The storage encoding process performed by identification encoder **112** also allows entry of a popularity code. The popularity code is preferably assigned on the basis of how often the corresponding item is expected to be requested from the compressed data library **118**. This popularity code can be used to determine the most appropriate form of media for storage of the compressed data in a mixed media system. Mixed media systems are preferably employed as more cost effective storage in very large compressed data libraries **118**. Once assigned, the popularity code may be dynamically updated, by factoring item usage against system usage. Thus, stored items are dynamically moved to the most appropriate media over their life in the compressed data library **118**. If a particular item stored in compressed data library **118** is retrieved frequently by users, storage in compressed data library **118** is preferably on higher speed, more reliable, and probably more expensive media. Such media includes Winchester and magneto-optical disks.

If an item stored in compressed data library **118** is retrieved less frequently, it may be stored in the compressed data library **118** on a digital cassette tape. Examples of such cassette tapes are a Honeywell RSS-600 (Honeywell Inc. Minneapolis Minn.), Summus JukeBoxFilm and tape library (Summus Computer Systems, Houston, Tex. 800-255-9638), or equivalent cassette tapes. All items stored in the compressed data library **118** are on line and are connected to the high speed network. Thus, they may be readily accessed.

Instead of using a remote order processing and item database **300**, the compressed data library **118** may include the program notes which were input by the system operator. The program notes may preferably include the title of the item stored in the compressed data library **118**, chapter or song titles, running times, credits, the producer of the item, acting and production credits, etc. The program notes of an item stored in the compressed data library **118** may be thus contained within the compressed data file formed in the compressed data formatter **117**.

In some cases, where multiple compressed data libraries **118** are organized, the popularity code may dictate distribution of a particular item to multiple distribution systems. In such cases, a copy of the compressed data is sent to another library and the other library can then distribute the compressed data to users concurrently with the original compressed data library **118**.

The compressed data library **118** is composed of a network of storage devices connected through a High Performance Parallel Interface (HPPI) Super Controller (available from Maximum Strategy Inc., San Jose, Calif.). Therefore, multiple communication controllers may preferably access the large quantity of data stored in compressed data library **118** at very high speeds for transfer to a reception system **200** of a user upon request. For more details on this configuration see Ohrenstein, "Supercomputers Seek High Throughput and Expandable Storage", Computer Technology Review, pp. 33–39 April 1990.

The use of an HPPI controller allows file placement onto multiple mass storage devices of the compressed data library **118** with a minimum of overhead. Database management software controls the location and tracking of the compressed data library **118** which can be located across multiple clusters of file servers connected together by one or more high speed networks over multiple systems.

The transmission system **100** of the present invention may also preferably include library access/interface means for

receiving transmission requests to transmit items and for retrieving formatted data blocks stored in the compressed data library **118** corresponding to the requests from users. The compressed audio and/or video data blocks, along with any of the information about the item stored in the compressed data library **118** may be accessed via library access interface **121**. The library access interface **121** receives transmission requests either directly from the users or indirectly by remote order processing and item database **300**. The transmission format means **119** receives the request and retrieves the composite formatted data block of the requested item stored in compressed data library **118** and converts the compressed formatted data block into a format suitable for transmission. The requested item is then sent to the user via the transmitter **122** or directly via interface **121**.

In a preferred embodiment of the present invention, customer access of an item stored in compressed data library **118** via the library access interface **121** may be performed in various ways. The methods of requesting a stored item are analogous to making an airline reservation or transferring funds between bank accounts. Just as there are different methods available for these processes it is desirable to have several ordering methods available to the users of the system of the present invention. For example, telephone tone decoders and voice response hardware may be employed. Additionally, operator assisted service or user terminal interfaces may be used.

Customer access via telephone tone decoders and voice response hardware is completely electronic and may preferably be performed between a system user and a computer order entry system. The user may obtain help in ordering an item from a computer synthesized voice. With such an access method, the user will normally be accessing a dynamic catalog to assist them. Confirmation of selections and pricing information may preferably be given to the user prior to completion of the transaction.

This process of access, performed by remote order processing and item database configuration **300**, shown in FIG. **1***c*, preferably includes the following steps, shown in flowchart **3000** of FIG. **3**. First, the user calls the system access number (step **3010**). Upon successfully dialing the system access number, the user receives instructions from the system (step **3020**). The instructions may preferably include steps the user must take in order to place an order. Preferably, the instructions may be bypassed by the experienced user who knows how to place an order.

The user then enters a customer ID code by which the system accesses the user's account, and indicates to the system that the user is a subscriber of the system (step **3030**). In response to the user entering his ID code in step **3030** the system confirms whether the user is in good standing (step **3040**). If the user is in good standing, the system queues the user to input his request (step **3050**).

The user request may preferably be made from a catalog sent to each of the subscribers of the system. The user will preferably identify his choice and enter the corresponding identification code of the item (step **3060**). The system then preferably confirms the selection that the user has made and informs the user of the price of the selection (step **3070**).

The user then indicates whether the confirmation performed in step **3070** is correct (step **3080**). If the confirmation performed in step **3070** is correct, the user so indicates and then inputs a desired delivery time and delivery location (step **3090**).

If the confirmation performed in step **3070** does not result in the selection desired by the user, the user re-inputs the item identification code in step **3060** and the confirmation steps **3070** and **3080** are repeated. Therefore, proper selection of the selected item is insured. Once there is confirmation, the user enters the playback time and destination in step **3090**.

The user then preferably confirms that the order is correct (step **3100**). The confirmation performed in step **3100** includes confirmation of the entire transaction including the selected item, the selected time of playback, and the location of playback. The transaction is then completed and the request is placed on a transmission queue at the appropriate compressed data library **118** (step **3110**).

Access by the users via operator assisted service includes telephone operators who answer calls from the users. The operators can sign up new customers, take orders, and help with any billing problems. The operators will preferably have computer terminals which give them access to account information and available program information. Operators can also assist a user who does not know a title by looking up information stored in files which may contain the program notes, as described above. Once the chosen program is identified, the operator informs the user of the price. After the user confirms the order, the user indicates the desired delivery time and destination. The operator then enters the user request into the system. The request is placed in the transmission queue.

Access by a user terminal interface method provides the user with access from various terminals including personal computers, and specialized interfaces built into the reception system **200** for the user. Such access allows a user to do a search of available programs from a computer screen. This process involves the steps **4000** shown in FIG. **4**.

FIG. **4** is a flowchart of a preferred method of user request via a user interface of the present invention. In the preferred method of FIG. **4**, the user first logs onto the user terminal interface (step **4010**). After the user logs on, the user may preferably select a desired item by searching the database of available titles in the library system control computer **1123** or any remote order processing and item database **300** (step **4020**). The search may preferably be performed using the database containing the program notes, described above with respect to FIGS. **2***a* and **2***b*. It is possible to process orders and operate a database of available titles at multiple locations remote of the source material library **111**. Users and order processing operators may preferably access such remote systems and may place transmission requests from these systems. Orders placed on these systems will be processed and distributed to the appropriate libraries. After the desired item is found, the user selects the item for transmission at a specific time and location (step **4030**).

To complete an order, the remote order processing and item database **300** preferably connects to the compressed data library **118** of choice via the library access interface **121** and communicates with the library system control computer **1123**. Preferably the user's account ID, identification of the item for transmission and the chosen destination for the item are communicated. Through employment of distributed order processing systems of this type many orders may be processed with minimal library overhead.

All transmission requests from the access methods are placed into a transmission queue managed by the library system control computer **1123**. This queue is managed by a program that controls the distribution of the requested items to the reception system **200** of the user. The queue manager program also operates in the system control computer and keeps track of the user ID, the chosen program and price, the

user channel type, the number of requests for a given program, the latest delivery time, and the compressed data library media type (for example, high speed or low speed). From this information, the queue manager program makes best use of the available distribution channels and media for efficient transmission and storage of the requested items.

The queue manager program also manages the file transmission process for multiple requests for a single file, stored in the compressed data library **118**. During a given time period, the queue manager program will optimize access to the compressed data library **118**, wherever possible it will place the data on multiple outputs for simultaneous transmission to more than one requesting user.

The conversion performed by transmission data converter **119** encodes the data for the transmission channel. The transmission data converter transfers the desired segments of data from the compressed data library **118** onto the communication channel which is used to deliver the data to the reception system **200**.

The transmission system **100** of the present invention preferably further includes transmitter means **122**, coupled to the compressed data library **118**, for sending at least a portion of a specific file to at least one remote location. The transmission and receiving system of the present invention preferably operates with any available communication channels. Each channel type is accessed through the use of a communications adaptor board or processor connecting the data processed in the transmission format converter **119** to the transmission channel.

A preferred embodiment of the present invention also includes means by which to access users via common access lines. These may include standard telephone, ISDN or B-ISDN, microwave, DBS, cable television systems, MAN, high speed modems, or communication couplers. Metropolitan Area Networks (MANs) which are common carrier or private communication channels are designed to link sites in a region. MANs are described by Morreale and Campbell in "Metropolitan-area networks" (IEEE Spectrum, May 1990 pp. 40–42). The communication lines are used to transmit the compressed data at rates up to, typically, 10 Mb/sec.

In order to serve a multitude of channel types, a preferred embodiment of the present invention includes a multitude of output ports of each type connected to one or more computers on the transmission and receiving system. The management of transmission is then distributed. That is, the computer controlling the transmission que tells the transmission encoding computer its task and then the task is executed by the transmission encoding computer, independent of the transmission queue computer. The transmission queue computer provides the data for transmission by the file server which also distributes to other transmitters located in the same or other transmission encoding computers.

FIG. **5** is a flowchart of a preferred method of implementing a queue manager program of the present invention. The queue manager program, in the distribution process, preferably confirms availability of an item from the compressed data library **118** and logically connects the item stored in compressed data library **118** to the communications controller, illustrated in FIG. **2***a* (step **5010**). After availability is confirmed in step **5010**, the data awaits transmission by the transmitter **122**.

After availability is confirmed in step **5010**, the communications controller preferably makes the physical connection to the reception system **200** of the user (step **5020**). This is normally done by dialing the receiving device of the user. The reception system **200** preferably answers the incoming call and confirms the connection (step **5030**).

Once connected to the reception system **200**, in steps **5020** and **5030**, the data stored in compressed data library **118** is preferably transferred in data blocks from the compressed data library **118** to the communications controller (step **5040**). The data blocks are buffered by the communications controller. The buffered data is sent down the communications channel to the reception system **200** by transmitter **122** (step **5050**).

The transmitter **122** places the formatted data onto the communications channel. This is an electrical conversion section and the output depends upon the chosen communication path. The signal is sent to the reception system **200** in either a two way or a one way communication process. In a standard telephone connection, the transmitter **122** is preferably a modem. When using an ISDN channel, the transmitter **122** is preferably a data coupler.

In a preferred embodiment of the present invention, many forms of communication channels may be employed. Distribution of information is by common carrier communication channels whenever possible. These channels include common telephone service, ISDN and Broadband ISDN, DBS, cable television systems, microwave, and MAN.

In order that reception is performed efficiently, the reception system **200** confirms reception of the initial data block before receiving the remaining data blocks whenever possible (step **5060**). After all data blocks have been received and reception is confirmed, the communications controller breaks the physical connection to the reception system **200** (step **5070**). Then, confirmation of the transmission is sent to the queue manager (step **5080**). Finally, the queue manager updates the list and sends the information to the billing program, which updates the account of the user (step **5090**).

When item distribution occurs through a broadcasting method such as a communications satellite, the process is one way, with ongoing reception not being confirmed by the reception system **200**. In these situations, some further redundancy is included by transmission formatter **122** with the data blocks for error correction processing to be performed in the reception system **200**. In such one way communication situations, the queue manager program running in library system control computer **1123** confirms reception, via telephone line connection for example, to the reception system **200** after distribution. This should occur prior to updating the user's account and the dispatch lists.

The real time output signals are output to a playback system such as an audio amplifier and/or television. This output may also be sent to an audio/video recorder for more permanent storage. Moreover, in the preferred embodiment only non-copy protected data can be recorded on an audio/video recorder. Any material which is copy protected will be scrambled at the video output in a way which makes it viewable on a standard audio/video receiver but does not allow for recording of the material.

The reception system **200** has playback controls similar to the controls available on a standard audio/video recorder. These include: play, fast forward, rewind, stop, pause, and play slow. Since items are preferably stored on random access media, the fast forward and rewinding functions are simulations of the actual events which occur on a standard audio/video recorder. Frames do not tear as on an audio/video recorder, but in fast play modes they go by very quickly.

The library access interface **121** in the reception system **200** preferably includes a title window where a list of available titles are alphabetically listed. This window has two modes: local listing of material contained within the

library system control computer **1123**, and library listing for all available titles which may be received from the available, remotely accessible libraries. The titles listed in this window are sent from the database on the library system control computer **1123** or the remote order processing and item database **300**.

The system may also preferably include dispatching control software which receives input from the remote order processing and item database **300** and sends distribution requests to the distribution systems. In instances where not all items are contained in each of the compressed data libraries **118**, the dispatching software will keep a list of the available titles in a particular compressed data library **118**. The dispatch software may also preferably coordinate network traffic, source material library **111** utilization, source material library **111** contents, and connection costs. By proper factoring of these variables, efficient use of the available distribution channels may be achieved.

FIG. **6** illustrates a block diagram of a preferred implementation of the reception system **200** according to the present invention. The reception system **200** is responsive to user requests for information stored in source material library **111**. The reception system **200** includes transceiver **201** which receives the audio and/or video information transmitted by transmitter **122** of the transmission system **100**. The transceiver **201** automatically receives the information from the transmitter **122** as compressed formatted data blocks.

The transceiver **201** is preferably connected to receiver format converter **202**. The receiver format converter **202** converts the compressed formatted data blocks into a format suitable for playback by the user in real time.

In the reception system **200** of the present invention, the user may want to play back the requested item from the source material library **111** at a time later than when initially requested. If that is the case, the compressed formatted data blocks from receiver format converter **202** are stored in storage **203**. Storage **203** allows for temporary storage of the requested item until playback is requested.

When playback is requested, the compressed formatted data blocks are sent to data formatter **204**. Data formatter **204** processes the compressed formatted data blocks and distinguishes audio information from video information.

The separated audio and video information are respectively decompressed by audio decompressor **209** and video decompressor **208**. The decompressed video data is then sent simultaneously converter **206** including digital video output converter **211** and analog video output converter **213**. The decompressed audio data is sent simultaneously to digital audio output converter **212** and analog audio output converter **214**. The outputs from converters **211–214** are produced in real time.

The real time output signals are output to a playback system such as a TV or audio amplifier. They may also be sent to an audio/video recorder of the user. By using the reception system **200** of the present invention, the user may utilize the stop, pause, and multiple viewing functions of the receiving device. Moreover, in a preferred embodiment of the present invention, the output format converters may be connected to a recorder which enables the user to record the requested item for future multiple playbacks.

FIG. **7** is a flow chart **400** of a preferred method of distribution of the present invention. The distribution method is preferably responsive to requests identifying information to be sent from the transmission system **100** to remote locations. Method **400** assumes that the items have already been stored in compressed data library **118**.

As illustrated in FIG. **7**, the first step of the distribution method **400** involves retrieving the information for selected items in the source material library **111**, upon a request by a user of the distribution system (step **412**). This is analogous to taking books off of a shelf at the local public library after the person has decided that he or she would like to read them.

After the information for the selected items is retrieved in step **412**, the distribution method **400** of the present invention further comprises the step of processing the information for efficient transfer (step **413**). The processing performed in step **413** preferably includes assigning a unique identification code to the retrieved information performed by identification encoder **112**, shown and described with respect to FIG. **2***a* (step **413***a*). The processing also preferably includes placing the retrieved information into a predetermined format as formatted data by converter **113** (step **413***b*), and placing the formatted data into a sequence of addressable data blocks by ordering means **114** (step **413***c*).

Processing step **413** also includes compressing the formatted and sequenced data performed by data compressor **116** (step **413***d*), and storing as a file the compressed sequenced data received from the data compression means with the unique identification assigned by the identification encoding means (step **413***e*).

After the information is processed for efficient transfer, in substeps **413***a–e* of step **413**, the distribution method **400** of the present invention preferably includes the step of storing the processed information is stored in a compressed data library (step **414**). Preferably, the compressed data library is analogous to compressed data library **118**, described with respect to FIG. **2***a*.

After the information is stored in a compressed data library **118**, the transmission and receiving system preferably waits to receive a transmission request (step **415**). Upon receiving a transmission request, from transmission system **100**, the compressed formatted data is preferably converted for output to a reception system **200**, selected by the user. The information is preferably transmitted over an existing communication channel to a reception system **200**, and is received by that system (step **417**). When the information is received in step **417**, it is preferably formatted for the particular type of reception system **200** to which the information is sent.

The received information is preferably buffered (step **418**) by a storage means analogous to element **203** shown in FIG. **3**. The information is preferably buffered so that it may be stored by the user for possible future viewings. The requested information is then played back to the reception system **200** of the user at the time requested by the user (step **419**).

FIGS. **8***a–8e* are block diagrams of preferred implementations of data structures and data blocking for items in the audio and video distribution system. FIG. **8***a* shows the block structure of video data where a video frame **812** is composed of a plurality of video samples **811**, and a second of video **813** is composed of a plurality of video frames **812**.

FIG. **8***b* shows the block structure of audio data where an audio data frame **822** is composed of a plurality of audio samples **821**, and a second of audio **823** is composed of a plurality of audio data frames **822**. FIG. **8***c* shows the block structure of a data frame **832** composed of a plurality of data bytes **831**. The combination of the audio frames **812**, video frames **822**, and data frames **832** comprise the elements of a single item. FIG. **8***d* shows a block representation of for three illustrative items which may be stored in the source

material library **111**. Each of items 1–3 contains its own arrangement of video frames **812**, audio frames **822**, and data frames **832**.

FIG. **8***e* shows methods of distribution to reception systems **200** with both multiplexed and non-multiplexed signal paths, both addressed and non-addressed blocks of items. A block of an item may be an entire item or, alternatively, may be only a portion of an item, as selected by a user. Further, the blocks may be composed of either compressed, partially compressed, or fully decompressed data, as required by the configuration of the reception system **200**.

As shown in FIG. **8***e*, the same block, for example, block **1**, may be simultaneously transmitted over different distribution channels. The blocks when transmitted over one of the distribution channels may have receiver addresses appended to the blocks or the reception system **200** may have been preconfigured to receive the blocks comprising data frames for particular items from the active distribution channel.

Other embodiments of the invention will be apparent to those skilled in the art from consideration of the specification and practice of the invention disclosed herein. It is intended that the specification and examples be considered as exemplary only, with the true scope and spirit of the invention being indicated by the following claims.

What is claimed is:

1. A communication system comprising:

a transmission system at a first location in data communication with a reception system at a second location, wherein said transmission system comprises

a sequence encoder,

an identification encoder, and

a compressed data library in data communication with said identification encoder,

wherein said identification encoder gives items in said compressed data library a unique identification code; and

wherein said reception system comprises

a transceiver in data communication with said transmission system,

a storage device in data communication with said transceiver,

user playback controls in data communication with said storage device,

a digital compressor in data communication with said storage device, and

a playback device in data communication with said digital decompressor.

2. A communication system as recited in claim **1**, wherein said transmission system further comprises:

a source material library storing a portion of at least one data file.

3. A communication system as recited in claim **2**, wherein said transmission system further comprises:

a converter having a data input in data communication with said source material library and a digital data output.

4. A communication system as recited in claim **3**, wherein said transmission system further comprises:

a data compressor in data communication with said digital data output of said converter.

5. A communication system as recited in claim **1**, wherein said transmission system further comprises:

a compressed data formatting device in data communication with said identification encoder.

6. A communication system as recited in claim **1**, wherein said identification encoder allows entry of a popularity code.

7. A communication system as recited in claim **1**, wherein said sequence encoder transforms digital data blocks into a group of addressable data blocks.

8. A communication system as recited in claim **1**, wherein said transmission system further comprises:

a transmitter in data communication with said compressed data library, wherein

said transmitter sends at least a portion of a compressed data file to said reception system.

9. A communication system as recited in claim **1**, further comprising:

a user request interface in data communication with said transmission system,

wherein said user request interface enables a user to make a request for at least a portion of a data file.

10. A communication system as recited in claim **9**, wherein said reception system comprises said user request interface.

11. A communication system as recited in claim **1**, wherein said reception system further comprises:

a receiver format converter in data communication with said transceiver, wherein

said receiver format converter converts at least a portion of a data file into a format suitable for playback by a user.

12. A communicatioin system as recited in claim **1**, wherein said reception system further comprises:

an output data converter in data communication with said digital decompressor.

13. A communication system as recited in claim **1**, wherein said storage device stores at least a portion of a data file.

14. A communication system as recited in claim **13**, wherein said storage device is a temporary storage device.

15. A communication system as recited in claim **1**, wherein said storage device stores an entire data file.

16. A communication system as recited in claim **15**, wherein said storage device is a temporary storage device.

17. A communication system comprising:

a transmission system at a first location in data communication with a reception system at a second location, wherein said transmission system comprises

a source material library,

an identification encoder in data communication with said source material library,

a converter having a data input in data communication with said source material library and a digital data output,

a sequence encoder in data communication with said digital data output,

a digital data compressor in data communication with said digital data output,

a compressed data formatting device in data communication with said digital data compressor,

a compressed data library in data communication with said compressed data formatting device, and

a transmitter in data communication with said compressed data library; and wherein said reception system comprises

a transceiver in data communication with said transmission system,

a receiver format converter in data communication with said transceiver,

a storage device in data communication with said receiver format converter,

user playback controls in data communication with said storage device,

a digital decompressor in data communication with said receiver format converter, and

an output data converter in data communication with said digital decompressor.

18. A communication system as recited in claim **17**, wherein said digital data compressor is in data communication with said sequence encoder.

19. A communication system as recited in claim **17**, wherein said compressed data formatting device is in data communication with said identification encoder.

20. A communication system as recited in claim **17**, further comprising:

a user request interface in data communication with said transmission system.

21. A communication system as recited in claim **20**, wherein said reception system comprises said user request interface.

22. A communication system as recited in claim **17**, wherein said storage device stores at least a portion of a data file.

23. A communication system as recited in claim **17**, wherein said storage device stores an entire data file.

24. A communication system as recited in claim **17**, wherein said transceiver transmits a user request for a data file to said transmission system and receives the entire data file as compressed data blocks from said transmission system.

25. A communication system as recited in claim **17**, wherein said transceiver transmits a user request for at least a portion of a data file to said transmission system and receives the portion of the data file as compressed data blocks from said transmission system.

26. A communication system as recited in claim **17**, wherein said output data converter is in data communication with said storage device.

27. A communication system comprising:

a transmission system at a first location in data communication with a reception system at a second location, wherein said transmission system comprises:

an identification encoder, wherein said identification encoder allows entry of a popularity code; and

a compressed data library in data communication with said identification encoder; and

wherein said reception system comprises

a transceiver in data communication with said transmission system,

a storage device in data communication with said transceiver,

user playback controls in data communication with said storage device,

a digital decompressor in data communication with said storage device, and

a playback device in data communication with said digital decompressor.

28. A communication system as recited in claim **27**, wherein said transmission system further comprises:

a source material library storing a portion of at least one data file.

29. A communication system as recited in claim **28**, wherein said transmission system further comprises:

a converter having a data input in data communication with said source material library and a digital data output.

30. A communication system as recited in claim **29**, wherein said transmission system further comprises:

a data compressor in data communication with said digital data output of said converter.

31. A communication system as recited in claim **27**, wherein said transmission system further comprises:

a compressed data formatting device in data communication with said identification encoder.

32. A communication system as recited in claim **27**, wherein said transmission system further comprises a sequence encoder.

33. A communication system as recited in claim **32**, wherein said sequence encoder transforms digital data blocks into a group of addressable data blocks.

34. A communication system as recited in claim **27**, wherein said transmission system further comprises:

a transmitter in data communication with said compressed data library, wherein said transmitter sends at least a portion of a compressed data file to said reception system.

35. A communication system as recited in claim **27**, further comprising:

a user request interface in data communication with said transmission system, wherein

said user request interface enables a user to make a request for at least a portion of a data file.

36. A communication system as recited in claim **35**, wherein said reception system comprises said user request interface.

37. A communication system as recited in claim **27**, wherein said reception system further comprises:

a receiver format converter in data communication with said transceiver, wherein said receiver format converts at least a portion of a data file into a format suitable for playback by a user.

38. A communication system as recited in claim **27**, wherein said reception system further comprises:

an output data converter in data communication with said digital decompressor.

39. A communication system as recited in claim **27**, wherein said storage device stores at least a portion of a data file.

40. A communication system as recited in claim **27**, wherein said storage device stores an entire data file.

41. A communication system as recited in claim **39**, wherein said storage device is a temporary storage device.

42. A communication system as recited in claim **40**, wherein said storage device is a temporary storage device.

* * * * *

UNITED STATES PATENT AND TRADEMARK OFFICE

CERTIFICATE OF CORRECTION

PATENT NO. : 6,144,702
DATED : November 7, 2000
INVENTOR(S) : Paul Yurt et al.

It is certified that error appears in the above-identified patent and that said Letters Patent is hereby corrected as shown below:

Column 19,
Line 44, replace "compressor" with -- decompressor --.

Signed and Sealed this

Fifteenth Day of April, 2003

JAMES E. ROGAN
Director of the United States Patent and Trademark Office

EXHIBIT

11

US006002720A

United States Patent [19]

Yurt et al.

[11] Patent Number: 6,002,720

[45] Date of Patent: Dec. 14, 1999

[54] **AUDIO AND VIDEO TRANSMISSION AND RECEIVING SYSTEM**

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[73] Assignee: **H. Lee Browne, D/B/A Greenwich Information Technologies LLC**, Greenwich, Conn.

[21] Appl. No.: **08/630,590**

[22] Filed: **Apr. 10, 1996**

Related U.S. Application Data

[63] Continuation of application No. 08/133,982, Oct. 8, 1993, Pat. No. 5,550,863, which is a continuation of application No. 07/862,508, Apr. 2, 1992, Pat. No. 5,253,275, which is a continuation of application No. 07/637,562, Jan. 7, 1991, Pat. No. 5,132,992.

[51] **Int. Cl.**[6] **H04N 7/10**

[52] **U.S. Cl.** **375/240**; 375/259; 375/377; 455/4.2; 348/7; 348/8

[58] **Field of Search** 375/240, 259, 375/295, 316, 377; 348/1, 6–8, 10, 12–14, 17, 384, 385, 387, 470, 473, 906; 379/90.1, 93.08, 93.1, 101.1, 102.1–102.3; 455/2, 3.1, 4.1, 4.2, 5.1, 6.3

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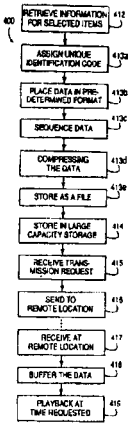
Attorney, Agent, or Firm—Andrea G. Reister; Erik B. Milch; Howrey & Simon

[57] **ABSTRACT**

A system of distributing video and/or audio information employs digital signal processing to achieve high rates of data compression. The compressed and encoded audio and/or video information is sent over standard telephone, cable or satellite broadcast channels to a receiver specified by a subscriber of the service, preferably in less than real time, for later playback and optional recording on standard audio and/or video tape.

11 Claims, 12 Drawing Sheets



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4,914,508	4/1990	Music et al.	358/13
4,920,432	4/1990	Eggers et al.	360/33.1
4,937,821	6/1990	Boulton	370/124
4,947,244	8/1990	Fenwick et al.	358/86
4,949,169	8/1990	Lumelsky et al.	358/86
4,949,187	8/1990	Cohen	358/335
4,963,995	10/1990	Lang	358/335
4,975,771	12/1990	Kassatly .	
5,014,267	5/1991	Tompkins et al.	370/62
5,032,927	7/1991	Watanabe et al.	398/133 X
5,057,927	10/1991	Lang .	
5,057,932	10/1991	Lang	358/133
5,062,136	10/1991	Gattis et al. .	
5,091,938	2/1992	Thompson et al. .	
5,093,718	3/1992	Hoarty et al.	358/84
5,109,414	4/1992	Harvey et al. .	
5,113,496	5/1992	McCalley et al. .	
5,119,188	6/1992	McCalley et al. .	
5,129,036	7/1992	Dean et al. .	
5,130,792	7/1992	Tindell et al.	348/7
5,132,992	7/1992	Yurt	375/122
5,133,079	7/1992	Ballantyne et al.	348/7
5,164,839	11/1992	Lang	358/335
5,191,573	3/1993	Hair .	
5,195,092	3/1993	Wilson et al.	348/13
5,239,540	8/1993	Rovira et al. .	
5,249,164	9/1993	Koz .	
5,276,866	1/1994	Paolini	395/603
5,341,175	8/1994	Koz .	
5,381,347	1/1995	Gery .	
5,473,362	12/1995	Fitzgerald et al. .	
5,502,503	3/1996	Koz .	
5,517,257	5/1996	Dunn et al. .	
5,566,301	10/1996	Koz et al. .	
5,581,297	12/1996	Koz et al. .	
5,592,233	1/1997	Koz .	
5,594,730	1/1997	Koz et al. .	
5,600,368	2/1997	Matthews, III .	
5,630,094	5/1997	Hayek et al. .	
5,644,355	7/1997	Koz et al. .	
5,648,824	7/1997	Dunn et al. .	
5,654,748	8/1997	Matthews, III .	
5,675,734	10/1997	Hair .	
5,687,331	11/1997	Volk et al. .	
5,701,511	12/1997	Smith .	
5,721,829	2/1998	Dunn et al. .	
5,721,950	2/1998	Tobagi et al. .	
5,724,543	3/1998	Ozden et al. .	
5,732,239	3/1998	Tobagi et al. .	
5,734,119	3/1998	France et al. .	
5,734,925	3/1998	Tobagi et al. .	
5,737,495	4/1998	Adams et al. .	
5,742,773	4/1998	Blomfield-Brown et al. .	
5,751,282	5/1998	Girard et al. .	
5,774,172	6/1998	Kapell et al. .	
5,781,228	7/1998	Sposato .	
5,793,980	8/1998	Glaser et al. .	
5,799,113	8/1998	Lee .	
5,801,692	9/1998	Muzio et al. .	
5,802,394	9/1998	Baird et al. .	
5,815,145	9/1998	Matthews, III .	
5,815,195	9/1998	Tam .	
5,815,662	9/1998	Ong .	
5,815,689	9/1998	Shaw et al. .	
5,818,972	10/1998	Girod et al. .	
5,826,110	10/1998	Ozden et al. .	
5,832,309	11/1998	Noe et al. .	
5,835,495	11/1998	Ferriere .	
5,844,594	12/1998	Ferguson .	
5,852,705	12/1998	Hanko et al. .	
5,861,906	1/1999	Dunn et al. .	

FIG. 1a

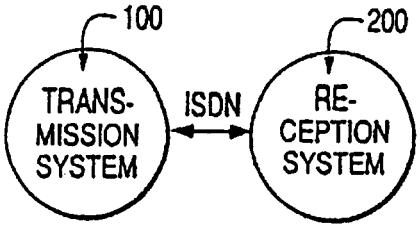


FIG. 1b

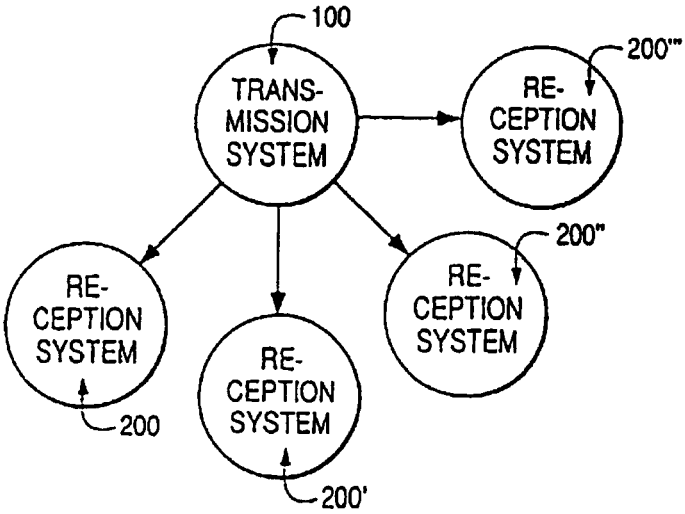
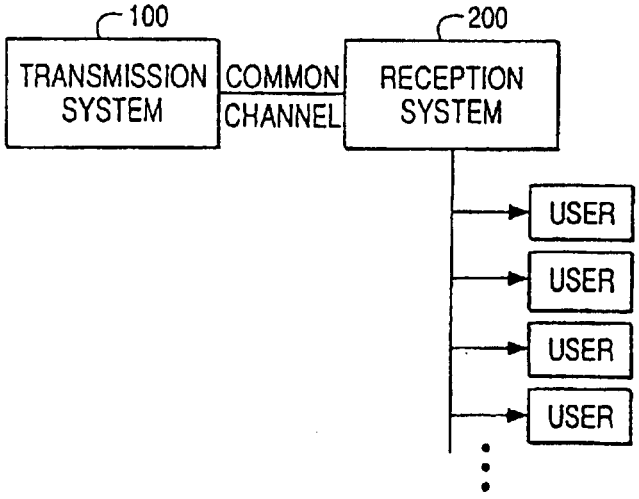


FIG. 1d



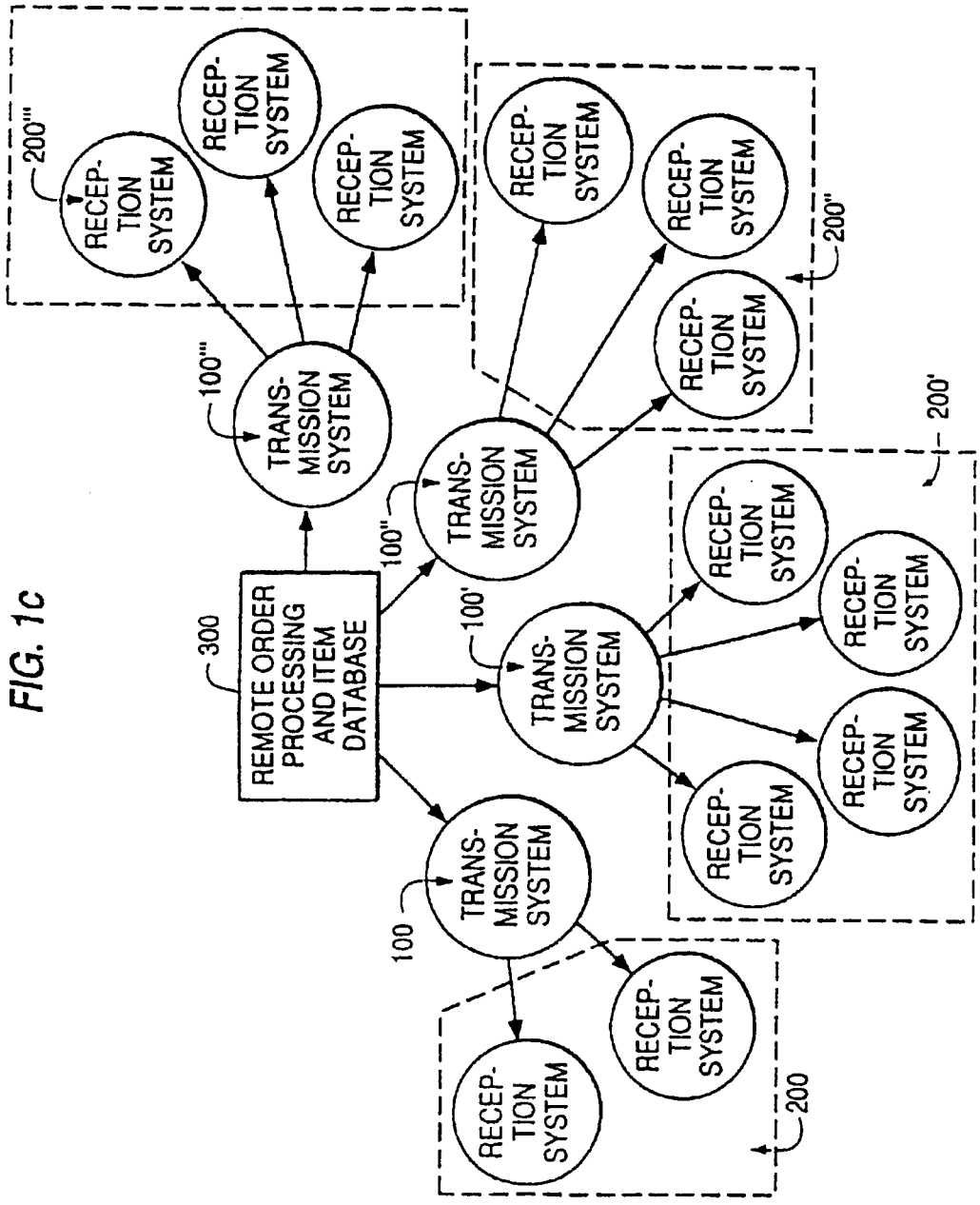

REMOTE ORDER PROCESSING AND ITEM DATABASE
300
TRANS-MISSION SYSTEM
100
100'
100"
100'''
RECEP-TION SYSTEM
200
200'
200"
200'''

FIG. 1c

FIG. 1e

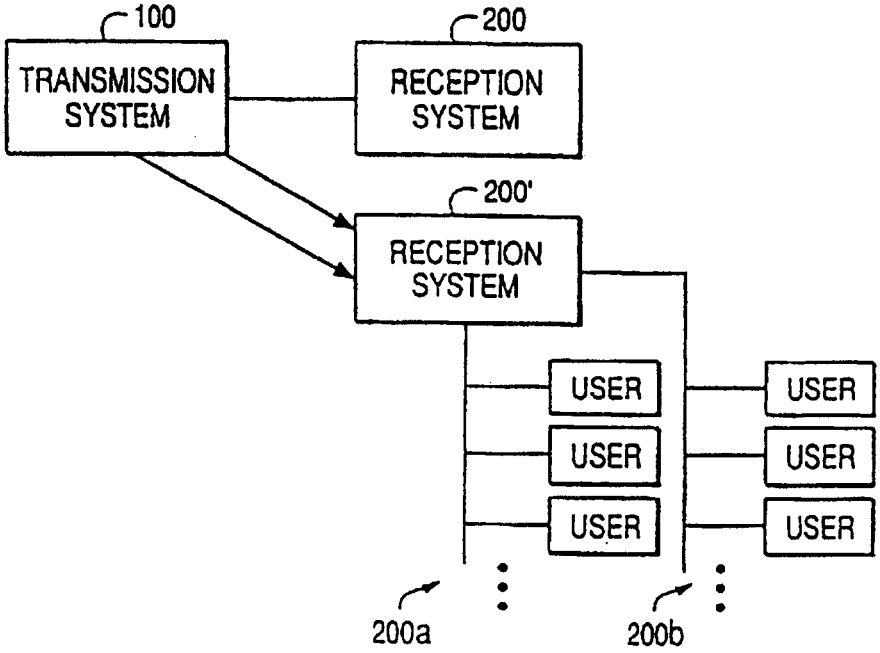

100
TRANSMISSION SYSTEM
200
RECEPTION SYSTEM
200'
RECEPTION SYSTEM
USER
USER
USER
USER
USER
USER
200a
200b

FIG. 1f

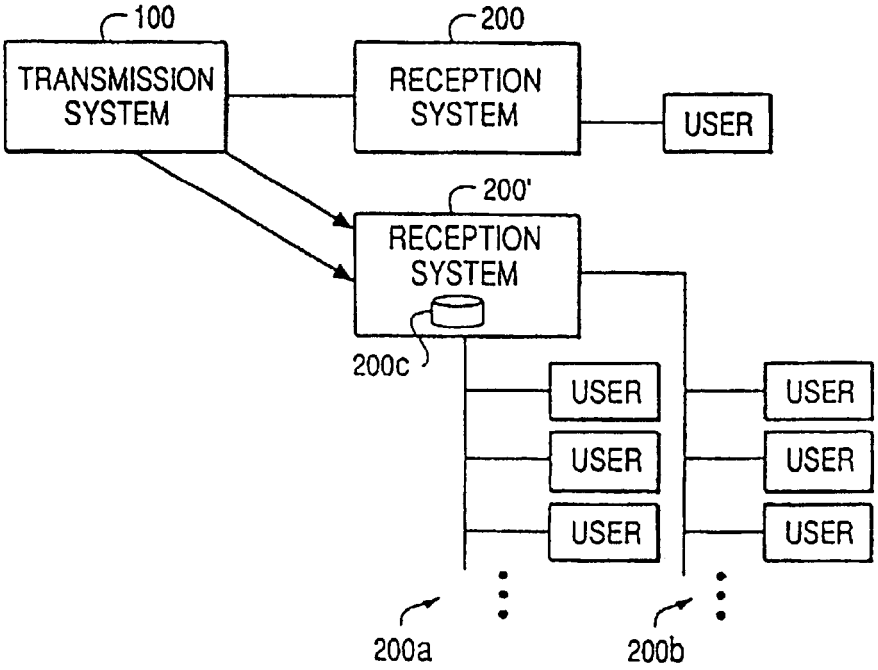

100
TRANSMISSION SYSTEM
200
RECEPTION SYSTEM
USER
200'
RECEPTION SYSTEM
200c
USER
USER
USER
USER
USER
USER
200a
200b

FIG. 1g

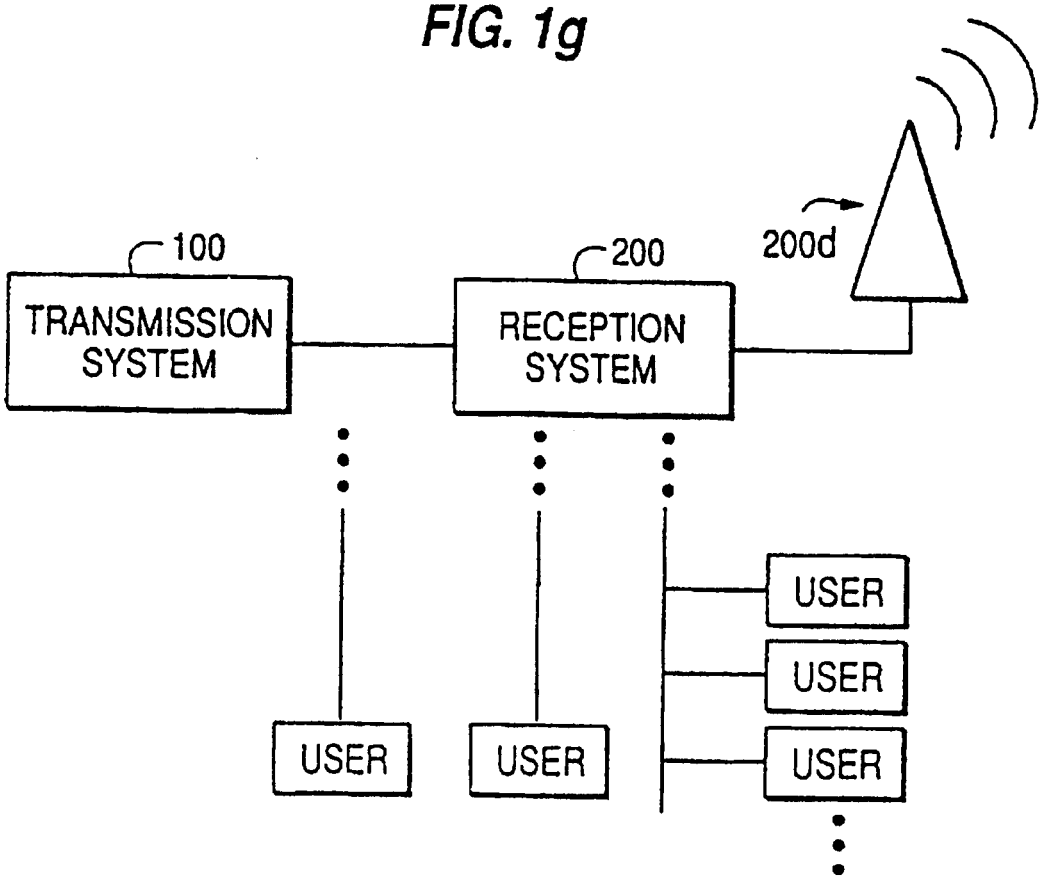
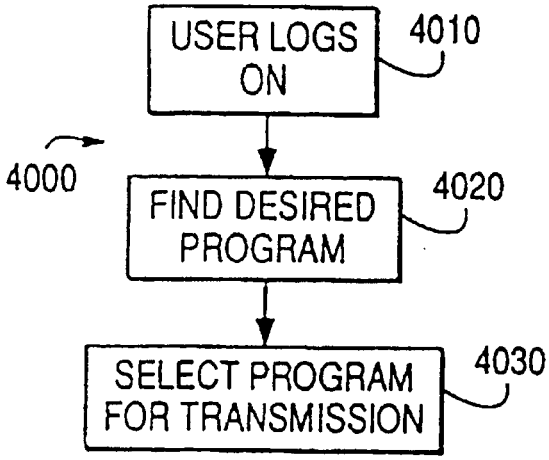

100
TRANSMISSION SYSTEM
200
RECEPTION SYSTEM
200d
USER
USER
USER
USER
USER

FIG. 4


USER LOGS ON
4010
4000
FIND DESIRED PROGRAM
4020
SELECT PROGRAM FOR TRANSMISSION
4030

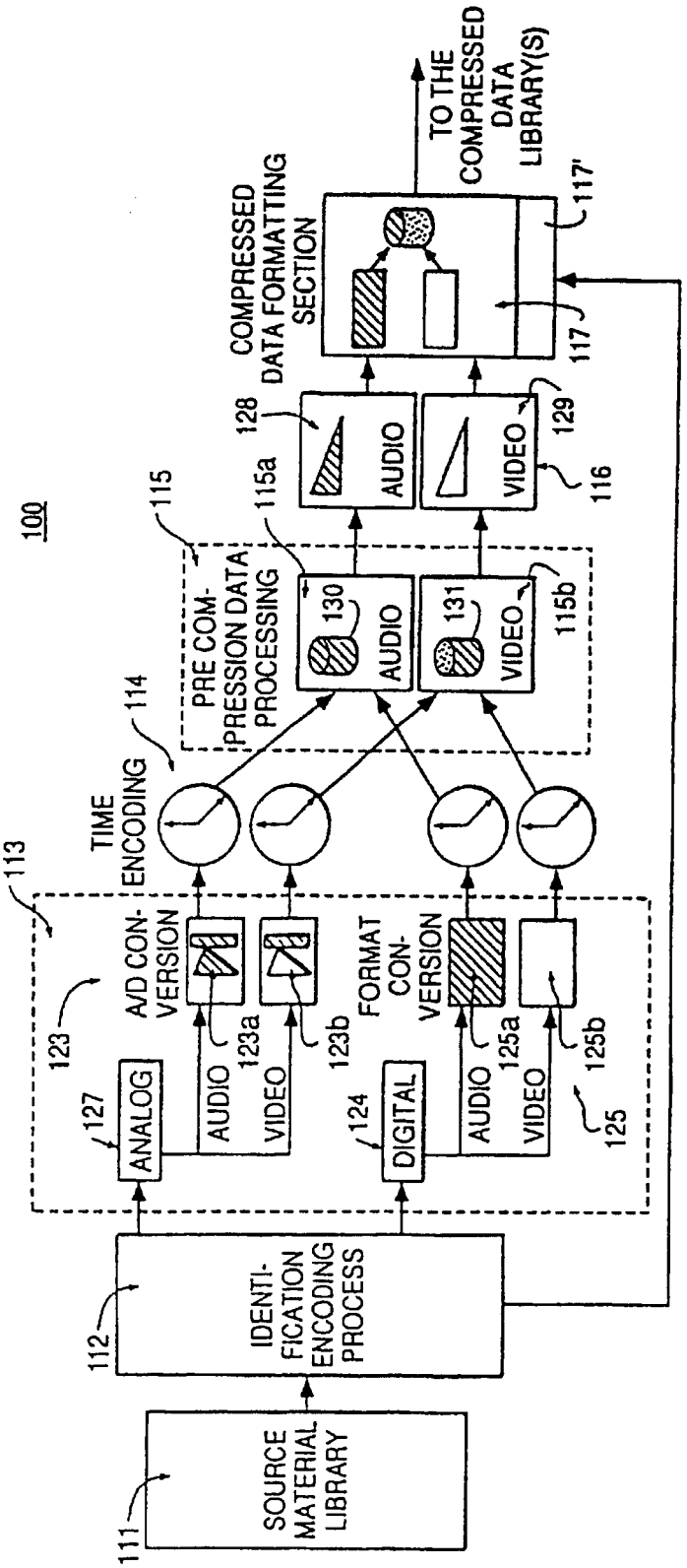

100
111
SOURCE MATERIAL LIBRARY
112
IDENTI-FICATION ENCODING PROCESS
113
123
A/D CON-VERSION
123a
AUDIO
123b
VIDEO
127
ANALOG
124
DIGITAL
FORMAT CON-VERSION
125a
AUDIO
125b
VIDEO
125
TIME ENCODING
114
115
PRE COM-PRESSION DATA PROCESSING
115a
130
AUDIO
131
VIDEO
115b
128
AUDIO
129
VIDEO
116
COMPRESSED DATA FORMATTING SECTION
117
117'
TO THE COMPRESSED DATA LIBRARY(S)

FIG. 2a

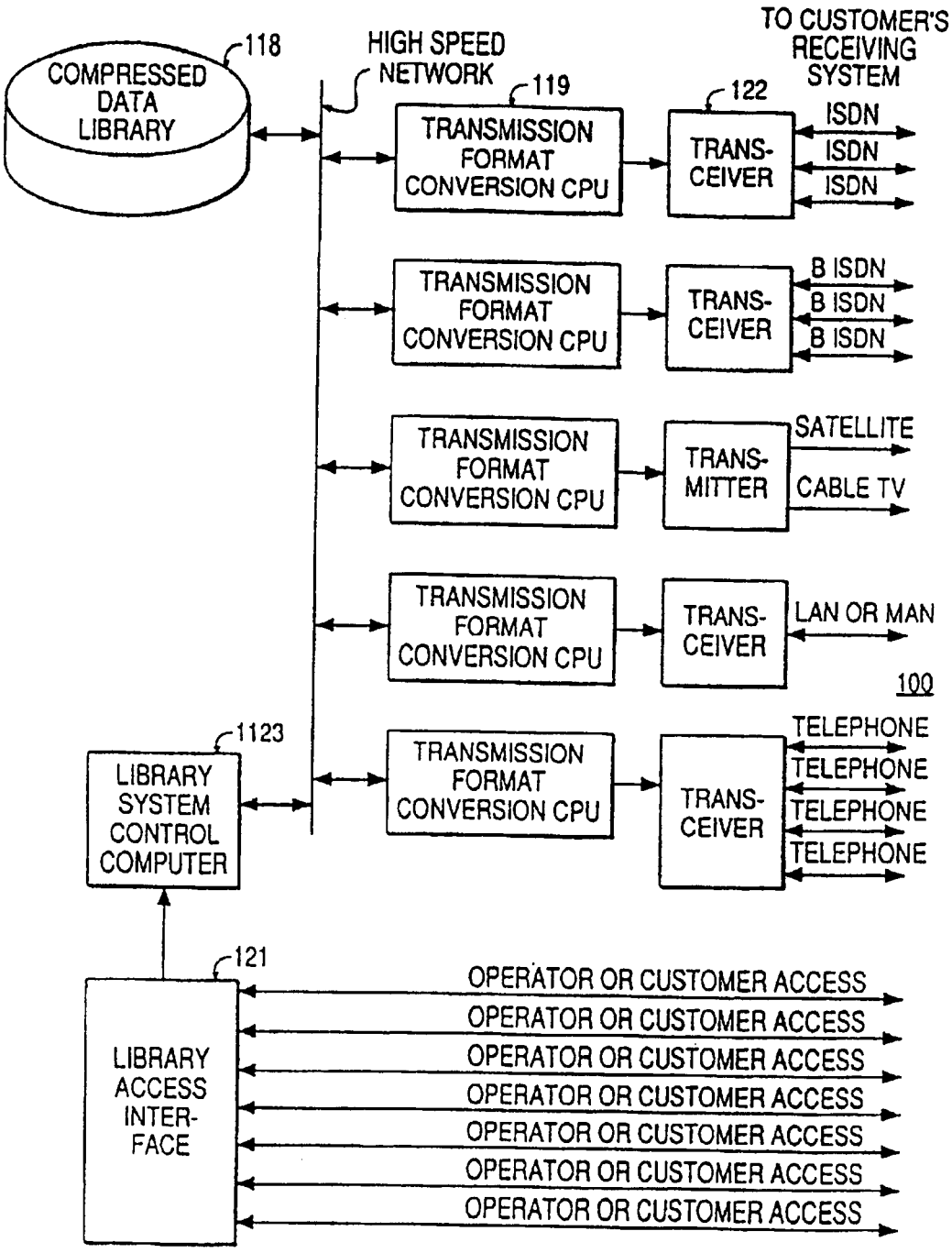

118
COMPRESSED DATA LIBRARY
HIGH SPEED NETWORK
119
TRANSMISSION FORMAT CONVERSION CPU
122
TRANS-CEIVER
TO CUSTOMER'S RECEIVING SYSTEM
ISDN
ISDN
ISDN
TRANSMISSION FORMAT CONVERSION CPU
TRANS-CEIVER
B ISDN
B ISDN
B ISDN
TRANSMISSION FORMAT CONVERSION CPU
TRANS-MITTER
SATELLITE
CABLE TV
TRANSMISSION FORMAT CONVERSION CPU
TRANS-CEIVER
LAN OR MAN
100
1123
LIBRARY SYSTEM CONTROL COMPUTER
TRANSMISSION FORMAT CONVERSION CPU
TRANS-CEIVER
TELEPHONE
TELEPHONE
TELEPHONE
TELEPHONE
121
LIBRARY ACCESS INTER-FACE
OPERATOR OR CUSTOMER ACCESS
OPERATOR OR CUSTOMER ACCESS
OPERATOR OR CUSTOMER ACCESS
OPERATOR OR CUSTOMER ACCESS
OPERATOR OR CUSTOMER ACCESS
OPERATOR OR CUSTOMER ACCESS
OPERATOR OR CUSTOMER ACCESS

FIG. 2b

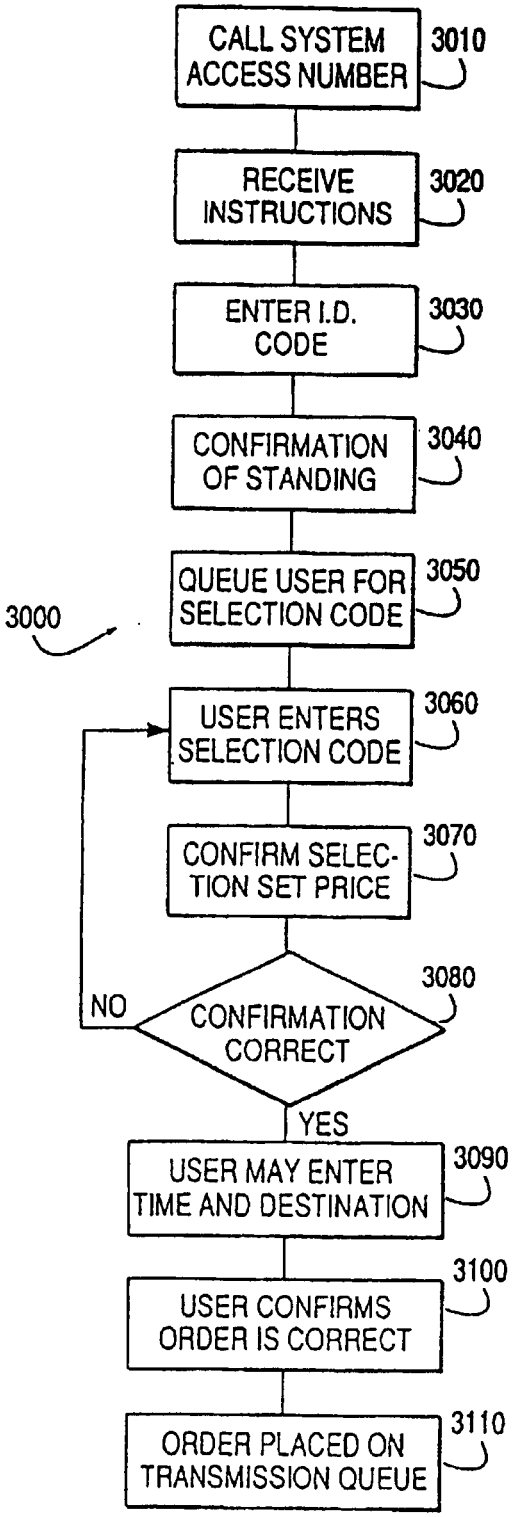

CALL SYSTEM ACCESS NUMBER
3010
RECEIVE INSTRUCTIONS
3020
ENTER I.D. CODE
3030
CONFIRMATION OF STANDING
3040
QUEUE USER FOR SELECTION CODE
3050
3000
USER ENTERS SELECTION CODE
3060
CONFIRM SELECTION SET PRICE
3070
CONFIRMATION CORRECT
3080
NO
YES
USER MAY ENTER TIME AND DESTINATION
3090
USER CONFIRMS ORDER IS CORRECT
3100
ORDER PLACED ON TRANSMISSION QUEUE
3110

FIG. 3

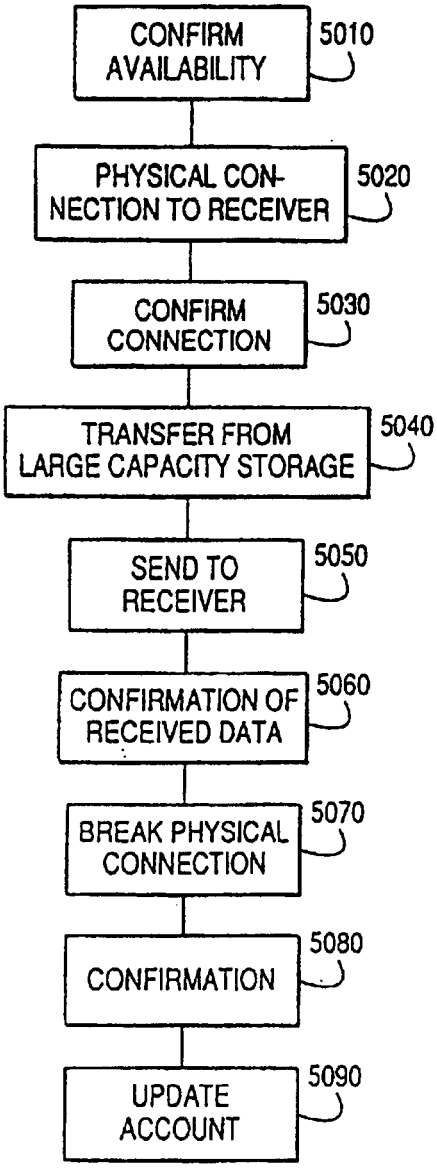

CONFIRM AVAILABILITY
5010
PHYSICAL CONNECTION TO RECEIVER
5020
CONFIRM CONNECTION
5030
TRANSFER FROM LARGE CAPACITY STORAGE
5040
SEND TO RECEIVER
5050
CONFIRMATION OF RECEIVED DATA
5060
BREAK PHYSICAL CONNECTION
5070
CONFIRMATION
5080
UPDATE ACCOUNT
5090

FIG. 5

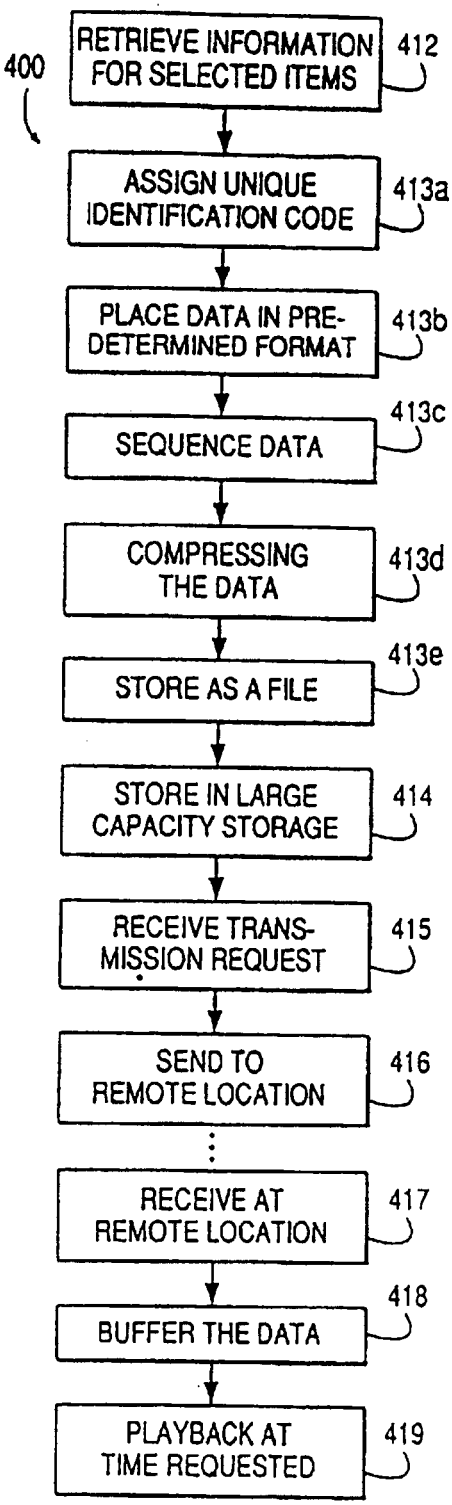

400
RETRIEVE INFORMATION FOR SELECTED ITEMS
412
ASSIGN UNIQUE IDENTIFICATION CODE
413a
PLACE DATA IN PRE-DETERMINED FORMAT
413b
SEQUENCE DATA
413c
COMPRESSING THE DATA
413d
STORE AS A FILE
413e
STORE IN LARGE CAPACITY STORAGE
414
RECEIVE TRANSMISSION REQUEST
415
SEND TO REMOTE LOCATION
416
RECEIVE AT REMOTE LOCATION
417
BUFFER THE DATA
418
PLAYBACK AT TIME REQUESTED
419

FIG. 7

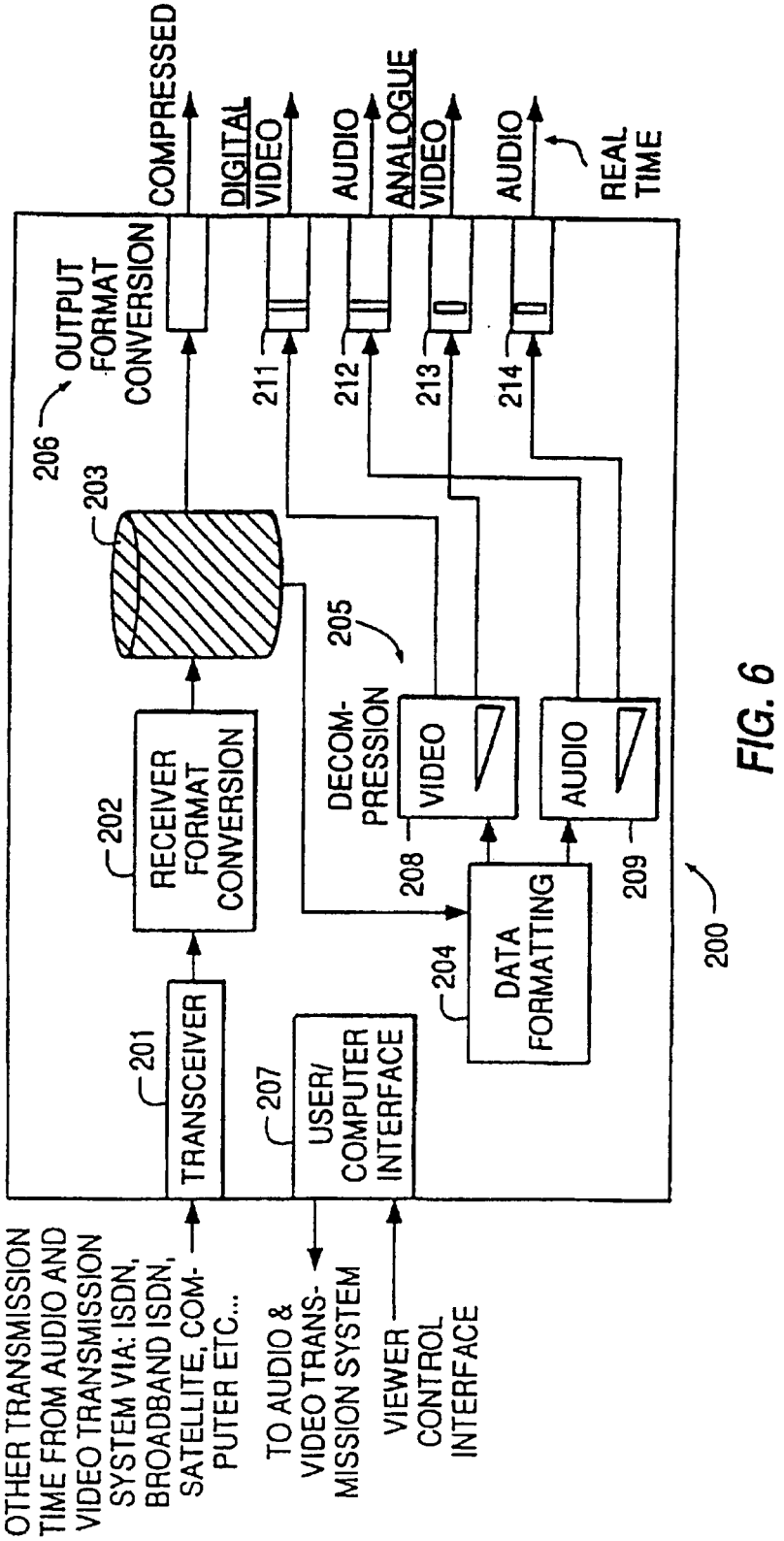

COMPRESSED
DIGITAL VIDEO
AUDIO
ANALOGUE VIDEO
AUDIO
REAL TIME
OUTPUT FORMAT CONVERSION
206
211
212
213
214
203
205
DECOM-PRESSION
VIDEO
AUDIO
RECEIVER FORMAT CONVERSION
202
208
209
200
204
DATA FORMATTING
201
TRANSCEIVER
207
USER/ COMPUTER INTERFACE
OTHER TRANSMISSION TIME FROM AUDIO AND VIDEO TRANSMISSION SYSTEM VIA: ISDN, BROADBAND ISDN, SATELLITE, COM-PUTER ETC...
TO AUDIO & VIDEO TRANS-MISSION SYSTEM
VIEWER CONTROL INTERFACE

FIG. 6

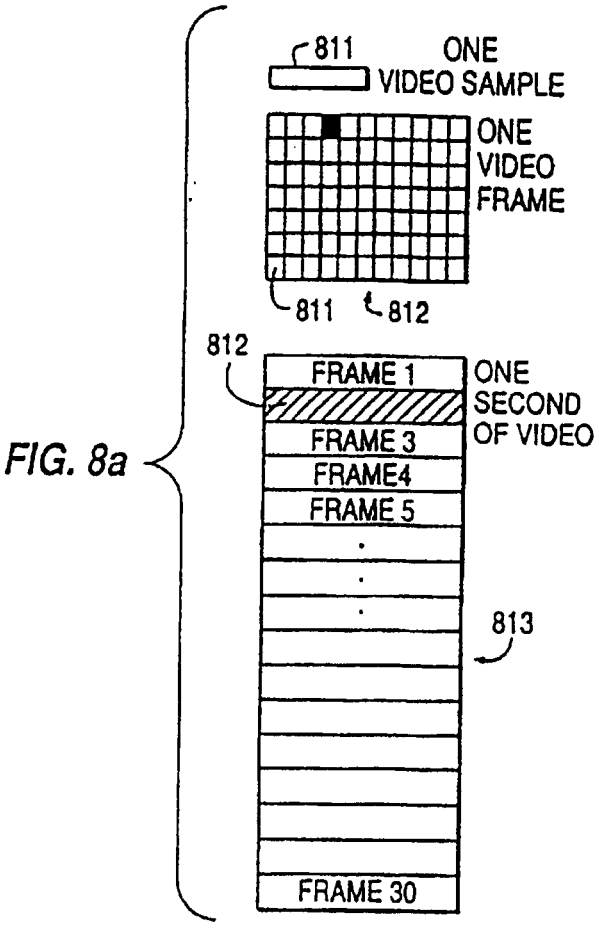

811
ONE
VIDEO SAMPLE
ONE
VIDEO
FRAME
811
812
812
FRAME 1
ONE
SECOND
OF VIDEO
FRAME 3
FRAME4
FRAME 5
813
FRAME 30

FIG. 8a

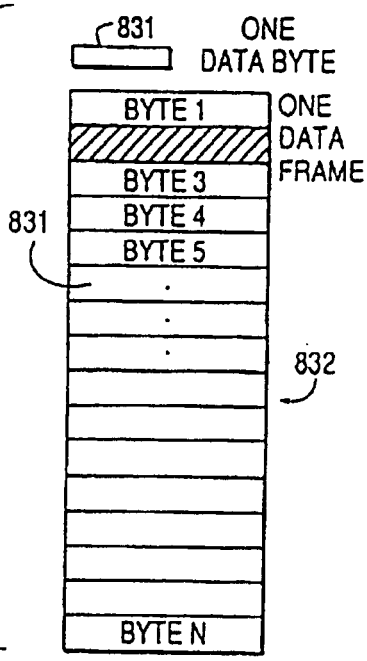

831
ONE
DATA BYTE
BYTE 1
ONE
DATA
FRAME
BYTE 3
BYTE 4
BYTE 5
831
832
BYTE N

FIG. 8c

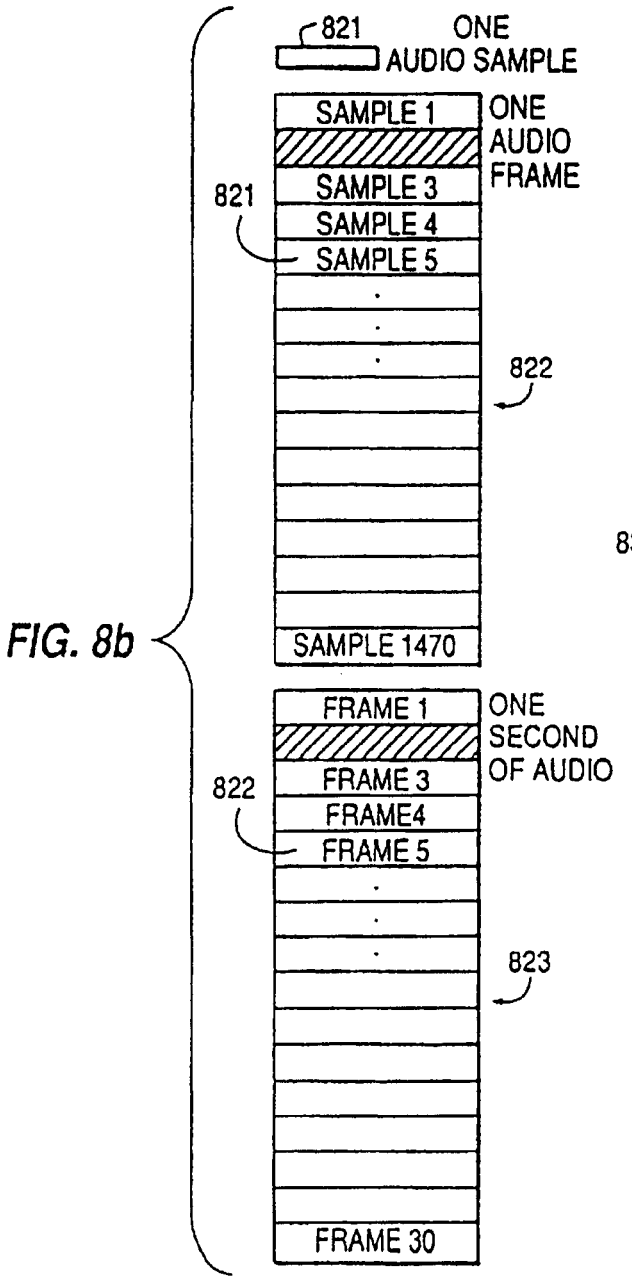

821
ONE AUDIO SAMPLE
SAMPLE 1
SAMPLE 3
SAMPLE 4
SAMPLE 5
SAMPLE 1470
ONE AUDIO FRAME
821
822
FRAME 1
FRAME 3
FRAME4
FRAME 5
FRAME 30
ONE SECOND OF AUDIO
822
823

FIG. 8b

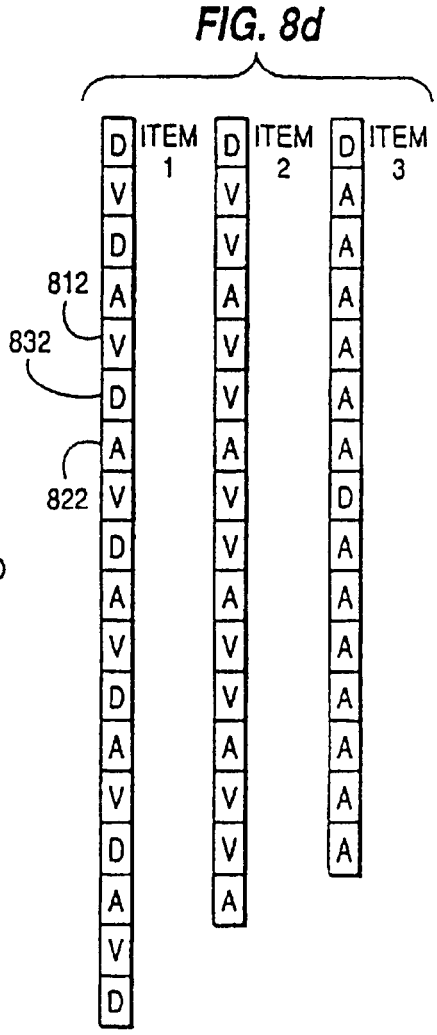

ITEM 1
ITEM 2
ITEM 3
812
832
822

FIG. 8d

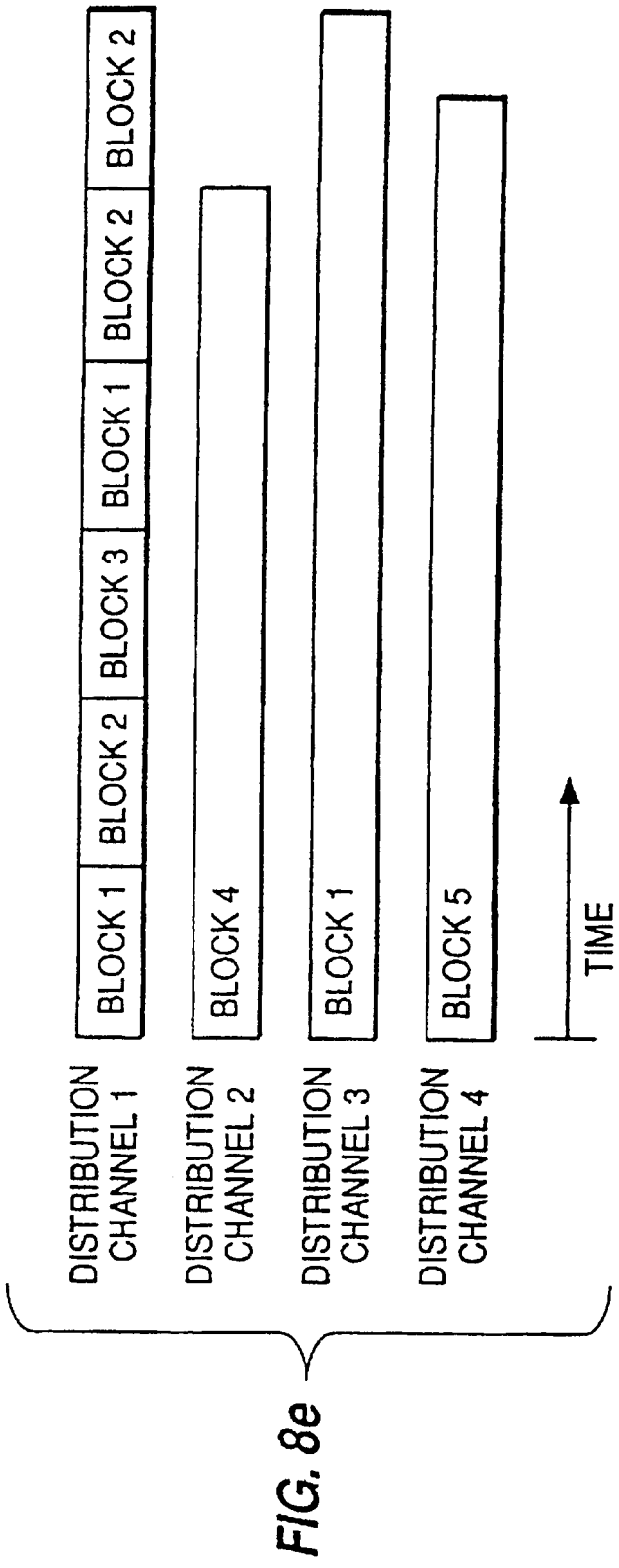

BLOCK 1
BLOCK 2
BLOCK 3
BLOCK 1
BLOCK 2
BLOCK 2
BLOCK 4
BLOCK 1
BLOCK 5
TIME
DISTRIBUTION CHANNEL 1
DISTRIBUTION CHANNEL 2
DISTRIBUTION CHANNEL 3
DISTRIBUTION CHANNEL 4

FIG. 8e

AUDIO AND VIDEO TRANSMISSION AND RECEIVING SYSTEM

This is a continuation of application Ser. No. 08/133,982, filed Oct. 8, 1993, U.S. Pat. No. 5,550,863 which is a continuation application of prior application Ser. No. 07/862,508 filed Apr. 2, 1992 which issued as U.S. Pat. No. 5,253,275 on Oct. 12, 1993, which is a continuation application of prior application Ser. No. 07/637,562 filed Jan. 7, 1991 which issued as U.S. Pat. No. 5,132,992 on Jul. 21, 1992.

BACKGROUND OF THE INVENTION

The present invention relates generally to an audio and video transmission and receiving system, and more specifically to such a system in which the user controls the access and the playback operations of selected material.

At the present time, only a video cassette recorder (VCR) or a laser disk player (LDP) allow a viewer to enjoy control over selection of particular audio/video material. Using either a VCR or an LDP requires the viewer to obtain a video tape either by rental or by purchase. Remote accessing of the material has not yet been integrated into an efficient system.

Several designs have been developed which provide the viewer with more convenient means of accessing material. One such design is disclosed in U.S. Pat. No. 4,506,387, issued to Walter. The Walter patent discloses a fully dedicated, multi-conductor, optical cable system that is wired to the viewer's premises. While the system affords the viewer some control over accessing the material, it requires that a location designated by the viewer be wired with a dedicated cable. The Walter system further requires the viewer be at that location for both ordering and viewing the audio/video material.

U.S. Pat. No. 4,890,320, issued to Monslow, describes a system which broadcasts viewer selected material to a viewer at a prescribed time. This system is limited in that it requires multiple viewers in multiple locations to view the audio/video material at the time it is broadcast, rather than allowing each viewer to choose his or her own viewing time. The system disclosed in Monslow also does not allow for the stop, pause, and multiple viewing functions of existing VCR technology.

U.S. Pat. No. 4,590,516, issued to Abraham, discloses a system that uses a dedicated signal path, rather than multiple common carriers, to transmit audio/video programming. The receiver has no storage capability. The system provides for only display functions, which limits viewing to the time at which the material is ordered. Like Monslow, the Abraham system does not allow for the stop, pause, and multiple viewing functions of existing VCR technology.

U.S. Pat. No. 4,963,995, issued to Lang, discloses an audio/video transceiver with the capability of editing and/or copying from one video tape to another using only a single tape deck. Lang does not disclose a system with one or more libraries wherein a plurality of system subscribers may access information stored in the film and tape library or libraries, and play back the selected information at a time and place selected by the subscriber.

It is therefore an object of the present invention to provide a user with the capability of accessing audio/video material by integrating both accessing and playback controls into a system that can use multiple existing communications channels.

It is a further object of the present invention to provide a picture and sound transmission system which allows the user

to remotely select audio/video material from any location that has either telephone service or a computer.

A still further object of the present invention is to provide a picture and sound transmission system wherein the selected audio/video material is sent over any one of several existing communication channels in a fraction of real time to any location chosen by the user that has a specified receiver.

Another object of the present invention is to provide a picture and sound transmission system wherein the user may play back the selected audio/video material at any time selected by user and retain a copy of the audio/video material for multiple playbacks in the future.

Another object of the present invention is to provide a picture and sound transmission system wherein the information requested by the user may be sent as only audio information, only video information, or as a combination of audio and video information.

Additional objects and advantages of the invention will be set forth in the description which follows, and in part will be obvious from the description, or may be learned by practice of the invention. The objects and advantages of the invention may be realized and obtained by means of the instrumentalities and combinations particularly pointed out in the appended claims.

SUMMARY OF THE INVENTION

To achieve the objects in accordance with the purposes of the present invention, as embodied and described herein, the transmission and receiving system for providing information to remote locations comprises source material library means prior to identification and compression; identification encoding means for retrieving the information for the items from the source material library means and for assigning a unique identification code to the retrieved information; conversion means, coupled to identification encoding means, for placing the retrieved information into a predetermined format as formatted data; ordering means, coupled to the conversion means, for placing the formatted data into a sequence of addressable data blocks; compression means, coupled to the ordering means, for compressing the formatted and sequenced data; compressed data storing means, coupled to the compression means, for storing as a file the compressed sequenced data received from the compression means with the unique identification code assigned by the identification encoding means; and transmitter means, coupled to the compressed data storing means, for sending at least a portion of a specific file to a specific one of the remote locations.

The present invention further comprises a distribution method responsive to requests identifying information to be sent from a transmission system to a remote location, the method comprising the steps of storing audio and video information in a compressed data form; requesting transmission, by a user, of at least a part of the stored compressed information to the remote location; sending at least a portion of the stored compressed information the remote location; receiving the sent information at the remote location; buffering the processed information at the remote location; and playing back the buffered information in real time at a time requested by the user.

Additionally, the present invention comprises a receiving system responsive to a user input identifying a choice of an item stored in a source material library to be played back to the subscriber at a location remote from the source material library, the item containing information to be sent from a transmitter to the receiving system, and wherein the receiving system comprises transceiver means for automatically

receiving the requested information from the transmitter as compressed formatted data blocks; receiver format conversion means, coupled to the transceiver means, for converting the compressed formatted data blocks into a format suitable for storage and processing resulting in playback in real time; storage means, coupled to the receiver format conversion means, for holding the compressed formatted data; decompressing means, coupled to the receiver format conversion means, for decompressing the compressed formatted information; and output data conversion means, coupled to the decompressing means, for playing back the decompressed information in real time at a time specified by the user.

BRIEF DESCRIPTION OF THE DRAWINGS

The accompanying drawings, which are incorporated in and constitute a part of the specification, illustrate the presently preferred apparatus and method of the invention and, together with the general description given above and the detailed description of the preferred embodiment given below serve to explain the principles of the invention. In the drawings:

FIGS. **1***a*–**1***g* are high level block diagrams showing different configurations of the transmission and receiving system of the present invention;

FIGS. **2***a* and **2***b* are detailed block diagrams of preferred implementations of the transmission system of the present invention;

FIG. **3** is a flowchart of a preferred method of ordering a selection from a library in accordance with the present invention;

FIG. **4** is a flowchart of a preferred method of user request via a user interface of the present invention;

FIG. **5** is a flowchart of a preferred method of implementing a queue manager program of the present invention;

FIG. **6** is a block diagram of a preferred implementation of the receiving system of the present invention;

FIG. **7** is a flowchart of a preferred method of distribution of the present invention; and

FIGS. **8***a*–**8***e* are block diagrams of preferred implementation of data structures and data blocking for items in the audio and video distribution system of the present invention.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

FIGS. **1***a*–**1***g* are high level block diagrams showing different configurations of the transmission and receiving system of the present invention. FIGS. **1***a*, **1***b*, **1***d*, **1***e*, **1***f*, and **1***g* each show transmission system **100**, described in more detail below with respect to FIGS. **2***a* and **2***b*. A user of the transmission and receiving system of the present invention preferably accesses transmission system **100** by calling a phone number or by typing commands into a computer. The user then chooses audio and/or video material from a list of available items which he or she wants to listen to and/or watch.

As shown in FIG. **1***a*, the transmission and receiving system may preferably comprise a peer to peer configuration where one transmission system **100** communicates with one reception system **200**. As shown in FIG. **1***b*, the transmission and receiving system of the present invention may alternatively comprise a plurality of reception systems **200**, **200'**, **200"**, and **200'"**, which are each associated with a single transmission system **100**.

FIG. **1***c* shows a high level block diagram of the transmission and receiving system of the present invention including remote order processing and item database **300**, described in more detail with respect to FIG. **3**. Remote order processing and item database **300** preferably enables users to access desired items by remote communication. The remote order processing and item database **300** may communicate with a plurality of transmission systems **100**, **100'**, **100"**, and **100'"**, each of which communicates with a respective set of reception systems **200**, **200'**, **200"**, and **200'"**. Each of the reception systems in sets **200**, **200'**, **200"**, and **200'"** may preferably communicate with a plurality of users.

FIG. **1***d* shows a high level block diagram of the transmission and receiving system of the present invention including a transmission system **100** distributing to a plurality of users via a reception system **200** configured as a cable television system.

FIG. **1***e* shows a high level block diagram of the transmission and receiving system of the present invention including a transmission system **100** distributing to a plurality reception systems **200** and **200'**. In the configuration shown in FIG. **1***e*, reception system **200** is a direct connection system wherein a user is directly connected to transmission system **100**. Reception system **200'** preferably includes a first cable television system **200***a* and a second cable television system **200***b*. Users of cable television systems **200***a* and **200***b* are indirectly connected to transmission system **100**

FIG. **1***f* shows a high level block diagram of the transmission and receiving system of the present invention including transmission system **100** distributing via several channels to reception systems **200** and **200'**. Reception system **200** is preferably non-buffering. In such a system, users are directly connected to transmission system **100**, as in reception system **200** in FIG. **1***e*.

Reception system **200'** shown in FIG. **1***f* is a cable television system, as shown in reception system **200'** of FIG. **1***e*. In FIG. **1***f*, the reception system **200'** is preferably buffering, which means that users may receive requested material at a delayed time. The material is buffered in intermediate storage device **200***c* in reception system **200'**.

In the configuration of FIG. **1***f*, decompression of the requested material may preferably occur at the head end of a cable television reception system **200'**. Thus, distribution may be provided to users via standard television encoding methods downstream of the head end of the cable distribution system. This method is preferred for users who only have cable television decoders and standard television receivers.

FIG. **1***g* shows a high level block diagram of the transmission and receiving system of the present invention including transmission system **100** distributing to a reception system **200**, which then preferably transmits requested material over airwave communication channels **200***d*, to a plurality of users. The transmission and receiving system shown in FIG. **1***g* may preferably transmit either compressed or uncompressed data, depending on the requirements and existing equipment of the user. The airwave transmission and receiving system shown in FIG. **1***g* may preferably employ either VHF, UHF or satellite broadcasting systems.

With respect to the transmission and receiving systems set forth in FIGS. **1***a*–**1***g*, the requested material may be fully compressed and encoded, partly decompressed at some stage in transmission system **100**, or fully decompressed prior to transmission. The reception systems **200** may either buffer the requested material for later viewing, or decompress in real time the requested material as it is distributed by transmission system **100**. Alternatively, the reception

systems **200** of the present invention may perform a combination of buffering and non-buffering by buffering some of the requested material and decompressing the remainder of the requested material for immediate viewing as it is distributed by transmission system **100**.

In direct connection configurations, such as reception systems **200** shown in FIGS. **1***e* and **1***f*, the user preferably selects the reception system **200** to which the requested material is sent, and optionally selects the time playback of the requested material as desired. Accordingly, the user may remotely access the transmission system **100** from a location different than the location of reception system **200** where the material will be sent and/or played back. Thus, for example, a user may preferably call transmission system **100** from work and have a movie sent to their house to be played back after dinner or at any later time of their choosing.

In non-direct connection reception systems such as shown in reception system **200'** of FIG. if, intermediate storage device **200***c* may preferably include, for example, sixteen hours of random access internal audio and video storage. A reception system with such storage is capable of storing several requested items for future playback. The user could then view and/or record a copy of the decompressed requested material in real time, or compressed in non-real time, at a time of their choosing. Accordingly, the user would not have to make a trip to the store to purchase or rent the requested material.

In any of the transmission and receiving systems illustrate in FIGS. **1***a*–**1***g*, the requested material may be copy protected. To achieve copy protection, the requested material, as an item, is encoded as copy protected during storage encoding in transmission system **100**. The user may then play back the item only one time. The user may also optionally review select portions of the item prior to its automatic erasure from the memory of the reception system **200**. In this way, requested material may be distributed to "view only" users and also to "view and copy" users who wish to retain copies of the distributed items.

Copy protected programs, when decompressed and played back would have a copy protection technique applied to the analog and digital output signals. The analog video output is protected from copying through the use of irregular sync signals, which makes the signal viewable on a standard television but not recordable on a audio/video recorder. The receiving system recognizes copy protected programs and disables the audio-video recorder. Digital output protection is effected through copy protect bit settings in the digital output signal, thus preventing a compatible digital recorder from recording the digital audio and/or video signal stream. A protected item will not be passed to the compressed data port of the digital recorder for off line storage.

FIGS. **2***a* and **2***b* illustrate detailed block diagrams of preferred implementations of the transmission system **100** of the present invention. Transmission system **100** may either be located in one facility or may be spread over a plurality of facilities. A preferred embodiment of transmission system **100** may preferably include only some of the elements shown in FIGS. **2***a* and **2***b*.

Transmission system **100** of a preferred embodiment of the present invention preferably includes source material library means for temporary storage of items prior to conversion and storage in a compressed data library means. The items of information may include analog and digital audio and video information as well as physical objects such as books and records which require conversion to a compatible media type before converting, compressing and storing their audio and video data in the compressed data library means.

As shown in FIG. **2***a*, the source material library means included in transmission system **100** preferably includes a source material library **111**. The source material library **111** may include different types of materials including television programs, movies, audio recordings, still pictures, files, books, computer tapes, computer disks, documents of various sorts, musical instruments, and other physical objects. These materials are converted to or recorded on a media format compatible to the digital and analog inputs of the system prior to being compressed and stored in a compressed data library **118**. The different media formats preferably include digital or analog audio and video tapes, laser disks, film images, optical disks, magnetic disks, computer tapes, disks and, cartridges.

The source material library **111**, according to a preferred embodiment of the present invention, may preferably include a single source material library or a plurality of source material libraries. If there are a plurality of source material libraries, they may be geographically located close together or may be located far apart. The plurality of source material libraries may communicate using methods and channels similar to the methods and channel types which libraries may employ for communication with the receiving system **200** of the user, or the source material libraries may communicate via any available method.

Prior to being made accessible to a user of the transmission and receiving system of the present invention, the item must be stored in at least one compressed data library **118**, and given a unique identification code by identification encoder **112**. Storage encoding, performed by identification encoder **112**, aside form giving the item a unique identification code, optionally involves logging details about the item, called program notes, and assigning the item a popularity code. Storage encoding may be performed just prior to conversion of the item for transmission to reception system **200**, at any time after starting the conversion process, or after storing the item in the compressed data library **118**.

In a preferred embodiment of the present invention, the method of encoding the information involves assigning a unique identification code and a file address to the item, assigning a popularity code, and inputting the program notes. This process is identical for any of the different media types stored in the source material library **111**.

The transmission system **100** of the present invention also preferably includes conversion means **113** for placing the items from source material library **111** into a predetermined format as formatted data. In the preferred embodiment, after identification encoding is performed by identification encoder **112**, the retrieved information is placed into a predetermined format as formatted data by the converter **113**. The items stored in source material library **111** and encoded by identification encoder **112** may be in either analog or digital form. Converter **113** therefore includes analog input receiver **127** and digital input receiver **124**. If items have only one format, only one type of input receiver **124** or **127** is necessary.

When the information from identification encoder **112** is digital, the digital signal is input to the digital input receiver **124** where it is converted to a proper voltage. A formatter **125** sets the correct bit rates and encodes into least significant bit (1sb) first pulse code modulated (pcm) data. Formatter **125** includes digital audio formatter **125***a* and digital video formatter **125***b*. The digital audio information is input into a digital audio formatter **125***a* and the digital video information, if any, is input into digital video formatter **125***b*. Formatter **125** outputs the data in a predetermined format.

When the retrieved information from identification encoder **112** is analog, the information is input to an analog-to-digital converter **123** to convert the analog data of the retrieved information into a series of digital data bytes. Converter **123** preferably forms the digital data bytes into the same format as the output of formatter **125**.

Converter **123** preferably includes an analog audio converter **123***a* and an analog video converter **123***b*. The analog audio converter **123***a* preferably converts the retrieved audio signal into pcm data samples at a fixed sampling rate. The analog video converter **123***b* preferably converts the analog video information, retrieved from identification encoder **123**, into pcm data also at fixed sampling rates.

If the retrieved information being converted contains only audio information, then the audio signal is fed to the appropriate digital audio input or analog audio input. When the retrieved information contains both audio and video information, the audio and video signals are passed simultaneously to the audio and video converter inputs. Synchronization between the audio and video data can be maintained in this way.

If, for example, the retrieved information to be converted from the source material library **111** is a motion picture film, the picture frames in the film are passed through a digital telecine device to the digital input receiver **124**. Format conversion is then preferably performed by digital video formatter **125***b*. Accompanying audio information is passed through an optical or magnetic digital playback device. This device is connected to digital audio formatter **125***a*.

In some cases, such as inter-library transfers, incoming materials may be in a previously compressed form so that there is no need to perform compression by precompression processor **115** and compressors **128** and **129**. In such a case, retrieved items are passed directly from identification encoder **112** to the compressed data formatter **117**. The item database records, such as the program notes which may also be input from another system, to the compressed data formatting section **117**, where this data, if necessary, is reformatted to make it compatible with the material stored in compressed data library **118**. Such material may be received in the form of digital tapes or via existing communication channels and may preferably input directly to a short term storage **117'** in the compressed data formatting section **117**.

The transmission system **100** of the present invention also preferably includes ordering means for placing the formatted information into a sequence of addressable data blocks. As shown in FIG. **2***a*, the ordering means in the preferred embodiment includes time encoder **114**. After the retrieved information is converted and formatted by the converter **113**, the information may be time encoded by the time encoder **114**. Time encoder **114** places the blocks of converted formatted information from converter **113** into a group of addressable blocks. The preferred addressing scheme employs time encoding. Time encoding allows realignment of the audio and video information in the compressed data formatting section **117** after separate audio and video compression processing by precompression processor **115** and compressor **116**.

The converted formatted information of the requested material is then preferably in the form of a series of digital data bytes which represent frames of video data and samples of the audio data. A preferred relationship of the audio and video bytes to each other is shown in FIG. **8**. Incoming signals are input and converted in sequence, starting with the first and ending with the last frame of the video data, and starting with the first and ending with the last sample of the audio data. Time encoding by time encoder **114** is achieved by assigning relative time markers to the audio and video data as it passes from the converter **113** through the time encoder **114** to the precompression processor **115**. Realignment of audio and video data, system addressing of particular data bytes, and user addressing of particular portions of items are all made possible through time encoding.

Through the use of the address of an item and its frame number it is possible to address any particular block of audio or video data desired. From here, further addressing down to the individual byte is possible. Frames and groups of frames may preferably be further broken down, as necessary to the individual bytes and bits, as required for certain processing within the system.

User and system addressing requirements dictate the level of granularity available to any particular section of the system. Users are able to move through data in various modes, thus moving through frame addresses at various rates. For example, a user may desire to listen to a particular song. They may preferably enter the song number either when requesting the item from the compressed data library **118** and only have that song sent to their receiving system **200** or they may preferably select that particular song from the items buffered in their receiving system **200**. Internal to the system, the song is associated with a starting frame number, which was indexed by the system operator via the storage encoding process. The system item database may contain information records for individual frames or groups of frames. These can represent still frames, chapters, songs, book pages, etc. The frames are a subset of, and are contained within, the items stored in the compressed data library **118**. Time encoding by time encoder **114** makes items and subsets of items retrievable and addressable throughout the transmission system **100**. Time encoding enables subsequent compression of the information to be improved because data reduction processes may be performed in the time dimension. This is described in greater detail below.

The transmission system **100** of the present invention also preferably includes data compression means for compressing the formatted and sequenced data. The sequence of addressable data blocks which was time encoded and output by time encoder **114** is preferably sent to precompression processor **115**. The data arriving from time encoder **114** may be at various frame rates and of various formats. Precompression processor **115** preferably includes audio precompressor **115***a* and video precompressor **115***b*.

Video precompression processor **115***b* buffers incoming video data and converts the aspect ratio and frame rate of the data, as required by compression processor **116**. The frame buffer **131** of video precompression processor **115***b* holds all incoming data until the data is compressed by the data compressor **116**. The incoming video data is processed for sample rate optimization, aspect ratio fitting and buffered in buffer **130** for compression processing by the video precompression processor **115***b*.

Video precompression processor **115***b* processes the incoming video data so that it fits into the aspect ratio of the transmission and receiving system of the present invention. When incoming material with a different aspect ratio than the aspect ratio of-the system is selected, a chosen background is preferably placed around the inactive region of the video information. In this way, no data is lost to differences in the aspect ratio between incoming material, and the converted and compressed data stored in the transmission system **100**. Images resulting from a different aspect ratio may have an inactive region where background information

is contained, or may be converted into a best fit arrangement. Output from the video precompression processor **115***b* is stored in the frame buffer **131**, which is dual ported and is directly addressable by video compressor **129**.

The incoming audio data is processed for sample rate and word length optimization and is then buffered in buffer **130** for compression processing by the audio precompression processor **115***a*. Audio precompression processor **115***a* may preferably transcode incoming audio information, as required, to create the optimum sample rate and word lengths for compression processing. The output of the audio precompression processor **115***a* is a constant sample rate signal of a fixed word length which is buffered in frame buffer **130**. The frame buffer **130** is dual ported and is directly addressable by audio compressor **128**. Blocking the audio data into frames at audio precompression processor **115***a* makes it possible to work with the audio data as addressable packets of information.

Once precompression processing is finished, the frames are compressed by the data compressor **116**. Compressor **116** preferably comprises an audio data compressor **128** and a video data compressor **129**. The benefits of data compression performed by data compressor **116** are shortened transmission time, faster access time, greater storage capacity, and smaller storage space requirements. Compression processing performed by compressors **128** and **129** requires multiple samples of data to perform optimum compression. Audio and video information is preferably converted into blocks of data organized in groups for compression processing by audio compressor **128** and video compressor **129**, respectively. These blocks are organized as frames, and a number of frames are contained respectively in the buffers **130** and **131**. By analyzing a series of frames it is possible to optimize the compression process.

Audio data is preferably compressed by audio compressor **128** by application of an adaptive differential pulse code modulation (ADPCM) process to the audio data. This compression process, which may be implemented by the apt-x 100 digital audio compression system, is manufactured by Audio Processing Technology (APT). Audio compression ratios of 8× or greater are achieved with the APT system.

Compression by compressor **116** may be performed on a group of 24 video frames may preferably be passed in sequence to the frame buffer **130** of the video precompression processor **115***b* where they are analyzed by video compressor **129** which performs data reduction processing on the video data. Video compression is preferably performed by video compressor **129**. Video compression is achieved by the use of processors running algorithms designed to provide the greatest amount of data compression possible. Video data compression preferably involves applying two processes: a discrete cosine transform, and motion compensation. This process is described in "A Chip Set Core of Image Compression", by Artieri and Colavin. Multiple frames of video data may preferably be analyzed for patterns in the horizontal (H), vertical (V), diagonal (zigzag) and time.(Z) axis. By finding repetition in the video data, redundancy may be removed and the video data may be compressed with a minimal loss of information.

In accordance with a preferred embodiment of the present invention, the transmission system **100** may further comprise compressed data storing means, coupled to the compression means, for storing as a file the compressed sequenced data with the unique identification code received from the data compression means. After compression processing by compressor **116**, the compressed audio and video data is preferably formatted and placed into a single file by the compressed data storage means **117**. The file may contain the compressed audio and/or video data, time markers, and the program notes. The file is addressable through the unique identification code assigned to the data by the identification encoder **112**.

Further, according to the present invention, the transmission system preferably includes compressed data library means for separately storing composite formatted data blocks for each of the files. The compressed data storage means preferably includes compressed data library **118**, as shown in FIG. **2***b*. After the data is processed into a file by the compressed data storage means **117**, it is preferably stored in a compressed data library **118**. In a preferred embodiment, compressed data library **118** is a network of mass storage devices connected together via a high speed network. Access to any of the files stored in compressed data library **118** is available from multiple reception systems **200** connected to the transmission and receiving system.

Stored items are preferably accessed in compressed data library **118** through a unique address code. The unique address code is a file address for uniquely identifying the compressed data items stored in the compressed data library section of a library system. This file address, combined with the frame number, and the library system address allow for complete addressability of all items stored in one or more compressed data libraries **118**. Compressed data library addresses along with receiving system addresses are used to form a completely unique address for distribution system control.

The unique address code is an address assigned to the item by the system operator during storage encoding, which is preferably done prior to long term storage in the compressed data library **118**. In a preferred embodiment, the unique address code is used for requesting and accessing information and items throughout the transmission and receiving system. The unique address code makes access to the requested data possible.

The storage encoding process performed by encoder **112** also allows entry of item notes and production credits. Production credits may include the title, names of the creators of the item such as the producer, director, actors, etc. Other details regarding the item which may be of interest and which may make the items more accessible are kept in an item database.

Item addresses are mapped to item names by identification encoder **112** and may preferably be used as an alternative method of accessing items. The item names are easier to remember, thus making user access more intuitive by using item names. The storage encoding entry process performed in identification encoder **112** operates a program which updates a master item database containing facts regarding items in the compressed data library system. The storage encoding process may be run by the system operator whereby the system operator accesses the master item database to track and describe items stored in one or more compressed data libraries. The names and other facts in the item database may preferably be updated at any time via the storage encoding process. Changes made to the master item database may be periodically sent to the remote order processing and item database **300**.

As described in more detail later, a user may preferably access an item via its unique identification code, via its title or the user may use other known facts for accessing an item. The user may access items in the compressed data library **118** direct using the unique address code or the user may

obtain access via the remote order processing and item database **300**. Indirect access via the remote order processing and item database **300** is possible using, for example, a synthesized voice system, a query type of computer program interface, or customer assistance operators. In addition to providing interactive access to the remote order processing and item database **300**, a catalog listing some or all available titles may also preferably be published. With a published catalog, users may obtain the unique address code for an item very easily thereby allowing for retrieval from the compressed data library **118** without any help from an interactive system.

To achieve user access via an interactive system, facts about the items may be kept in files as a part of the items or the facts may be kept separately, for example, by systems which only to inform users of the available items and take orders. For example, in systems which have portions split in separate locations, the facts about the items may be separated from the items themselves and stored in separate files. A system of this type can distribute user orders to other portions of the transmission and receiving system for ultimate distribution to the requesting user. Further, to support a plurality of users, multiple versions of the item database may preferably reside either on multiple database servers, in catalogs, or on other computer systems.

The item database master may reside in the system control computer **1123** where may be updated and kept current to the contents of the compressed data library **118**. The data stored in the item database master may be accessed by users via application programs, running on the system control computer **1123**, and on the reception system **200** of the user. Users may connect to the item database via any available telecommunication channels. Copies of the item database master may be updated and informed of new entries into compressed data library **118** at periodic intervals determined by the system manager.

Other copies of the item database master may also be made available to users from the remote order processing and item database **300** which batch processes and downloads user requests to the control computer **1123** of the compressed data library **118** via standard telecommunications or high speed communication channel. Moreover, multiple remote order processing and item database **300** sites make it possible for more locations to process orders than there are library facilities, and thus make order processing more efficient.

Preferably, access of a requested item via the remote order processing and item database **300** operates as follows. If the user does not know the title of the desired item, he or she may request the item by naming other unique facts related to the item. For example, a user would be able to access an item about Tibetan Medicine by asking for all items which include information about "Tibet" and include information about "Medicine." The remote order processing and item database **300** would then be searched for all records matching this request. If there is more than one item with a match, each of the names of the matching items are preferably indicated to the user. The user then selects the item or items that he or she desires. Upon selection and confirmation, by the user, a request for transmission of a particular item or items is sent to the distribution manager program of the system control computer **1123**. The request contains the address of the user, the address of the item, and optionally includes specific frame numbers, and a desired viewing time of the item.

The storage encoding process performed by identification encoder **112** also allows entry of a popularity code. The popularity code is preferably assigned on the basis of how often the corresponding item is expected to be requested from the compressed data library **118**. This popularity code can be used to determine the most appropriate form of media for storage of the compressed data in a mixed media system. Mixed media systems are preferably employed as more cost effective storage in very large compressed data libraries **118**. Once assigned, the popularity code may be dynamically updated, by factoring item usage against system usage. Thus, stored items are dynamically moved to the most appropriate media over their life in the compressed data library **118**. If a particular item stored in compressed data library **118** is retrieved frequently by users, storage in compressed data library **118** is preferably on higher speed, more reliable, and probably more expensive media. Such media includes Winchester and magneto-optical disks.

If an item stored in compressed data library **118** is retrieved less frequently, it may be stored in the compressed data library **118** on a digital cassette tape. Examples of such cassette tapes are a Honeywell RSS-600 (Honeywell Inc. Minneapolis Minn.), Summus JukeBoxFilm and tape library (Summus Computer Systems, Houston, Tex. 800-255-9638), or equivalent cassette tapes. All items stored in the compressed data library **118** are on line and are connected to the high speed network. Thus, they may be readily accessed.

Instead of using a remote order processing and item database **300**, the compressed data library **118** may include the program notes which were input by the system operator. The program notes may preferably include the title of the item stored in the compressed data library **118**, chapter or song titles, running times, credits, the producer of the item, acting and production credits, etc. The program notes of an item stored in the compressed data library **118** may be thus contained within the compressed data file formed in the compressed data formatter **117**.

In some cases, where multiple compressed data libraries **118** are organized, the popularity code may dictate distribution of a particular item to multiple distribution systems. In such cases, a copy of the compressed data is sent to another library and the other library can then distribute the compressed data to users concurrently with the original compressed data library **118**.

The compressed data library **118** is composed of a network of storage devices connected through a High Performance Parallel Interface (HPPI) Super Controller (available from Maximum Strategy Inc., San Jose, Calif.). Therefore, multiple communication controllers may preferably access the large quantity of data stored in compressed data library **118** at very high speeds for transfer to a reception system **200** of a user upon request. For more details on this configuration see Ohrenstein, "Supercomputers Seek High Throughput and Expandable Storage", Computer Technology Review, pp. 33–39 April 1990.

The use of an HPPI controller allows file placement onto multiple mass storage devices of the compressed data library **118** with a minimum of overhead. Database management software controls the location and tracking of the compressed data library **118** which can be located across multiple clusters of file servers connected together by one or more high speed networks over multiple systems.

The transmission system **100** of the present invention may also preferably include library access/interface means for receiving transmission requests to transmit items and for retrieving formatted data blocks stored in the compressed data library **118** corresponding to the requests from users. The compressed audio and/or video data blocks, along with

any of the information about the item stored in the compressed data library **118** may be accessed via library access interface **121**. The library access interface **121** receives transmission requests either directly from the users or indirectly by remote order processing and item database **300**.

The transmission format means **119** receives the request and retrieves the composite formatted data block of the requested item stored in compressed data library **118** and converts the compressed formatted data block into a format suitable for transmission. The requested item is then sent to the user via the transmitter **122** or directly via interface **121**.

In a preferred embodiment of the present invention, customer access of an item stored in compressed data library **118** via the library access interface **121** may be performed in various ways. The methods of requesting a stored item are analogous to making an airline reservation or transferring funds between bank accounts Just as there are different methods available for these processes it is desirable to have several ordering methods available to the users of the system of the present invention. For example, telephone tone decoders and voice response hardware may be employed. Additionally, operator assisted service or user terminal interfaces may be used.

Customer access via telephone tone decoders and voice response hardware is completely electronic and may preferably be performed between a system user and a computer order entry system. The user may obtain help in ordering an item from a computer synthesized voice. With such an access method, the user will normally be accessing a dynamic catalog to assist them. Confirmation of selections and pricing information may preferably be given to the user prior to completion of the transaction.

This process of access, performed by remote order processing and item database configuration **300**, shown in FIG. **1***c*, preferably includes the following steps, shown in flowchart **3000** of FIG. **3**. First, the user calls the system access number (step **3010**). Upon successfully dialing the system access number, the user receives instructions from the system (step **3020**). The instructions may preferably include steps the user must take in order to place an order. Preferably, the instructions may be bypassed by the experienced user who knows how to place an order.

The user then enters a customer ID code by which the system accesses the user's account, and indicates to the system that the user is a subscriber of the system (step **3030**). In response to the user entering his ID code in step **3030** the system confirms whether the user is in good standing (step **3040**). If the user is in good standing, the system queues the user to input his request (step **3050**).

The user request may preferably be made from a catalog sent to each of the subscribers of the system. The user will preferably identify his choice and enter the corresponding identification code of the item (step **3060**). The system then preferably confirms the selection that the user has made and informs the user of the price of the selection (step **3070**).

The user then indicates whether the confirmation performed in step **3070** is correct (step **3080**). If the confirmation performed in step **3070** is correct, the user so indicates and then inputs a desired delivery time and delivery location (step **3090**).

If the confirmation performed in step **3070** does not result in the selection desired by the user, the user re-inputs the item identification code in step **3060** and the confirmation steps **3070** and **3080** are repeated. Therefore, proper selection of the selected item is insured. Once there is confirmation, the user enters the playback time and destination in step **3090**.

The user then preferably confirms that the order is correct (step **3100**). The confirmation performed in step **3100** includes confirmation of the entire transaction including the selected item, the selected time of playback, and the location of playback The transaction is then completed and the request is placed on a transmission queue at the appropriate compressed data library **118** (step **3110**).

Access by the users via operator assisted service includes telephone operators who answer calls from the users. The operators can sign up new customers, take orders, and help with any billing problems. The operators will preferably have computer terminals which give them access to account information and available program information. Operators can also assist a user who does not know a title by looking up information stored in files which may contain the program notes, as described above. Once the chosen program is identified, the operator informs the user of the price. After the user confirms the order, the user indicates the desired delivery time and destination. The operator then enters the user request into the system. The request is placed in the transmission queue.

Access by a user terminal interface method provides the user with access from various terminals including personal computers, and specialized interfaces built into the reception system **200** for the user. Such access allows a user to do a search of available programs from a computer screen. This process involves the steps **4000** shown in FIG. **4**.

FIG. **4** is a flowchart of a preferred method of user request via a user interface of the present invention. In the preferred method of FIG. **4**, the user first logs onto the user terminal interface (step **4010**). After the user logs on, the user may preferably select a desired item by searching the database of available titles in the library system control computer **1123** or any remote order processing and item database **300** (step **4020**). The search may preferably be performed using the database containing the program notes, described above with respect to FIGS. **2***a* and **2***b*. It is possible to process orders and operate a database of available titles at multiple locations remote of the source material library **111**. Users and order processing operators may preferably access such remote systems and may place transmission requests from these systems. Orders placed on these systems will be processed and distributed to the appropriate libraries. After the desired item is found, the user selects the item for transmission at a specific time and location (step **4030**).

To complete an order, the remote order processing and item database **300** preferably connects to the compressed data library **118** of choice via the library access interface **121** and communicates with the library system control computer **1123**. Preferably the user's account ID, identification of the item for transmission and the chosen destination for the item are communicated. Through employment of distributed order processing systems of this type many orders may be processed with minimal library overhead.

All transmission requests from the access methods are placed into a transmission queue managed by the library system control computer **1123**. This queue is managed by a program that controls the distribution of the requested items to the reception system **200** of the user. The queue manager program also operates in the system control computer and keeps track of the user ID, the chosen program and price, the user channel type, the number of requests for a given program, the latest delivery time, and the compressed data library media type (for example, high speed or low speed). From this information, the queue manager program makes best use of the available distribution channels and media for efficient transmission and storage of the requested items.

The queue manager program also manages the file transmission process for multiple requests for a single file, stored in the compressed data library **118**. During a given time period, the queue manager program will optimize access to the compressed data library **118**, wherever possible it will place the data on multiple outputs for simultaneous transmission to more than one requesting user.

The conversion performed by transmission data converter **119** encodes the data for the transmission channel. The transmission data converter transfers the desired segments of data from the compressed data library **118** onto the communication channel which is used to deliver the data to the reception system **200**.

The transmission system **100** of the present invention preferably further includes transmitter means **122**, coupled to the compressed data library **118**, for sending at least a portion of a specific file to at least one remote location. The transmission and receiving system of the present invention preferably operates with any available communication channels. Each channel type is accessed through the use of a communications adaptor board or processor connecting the data processed in the transmission format converter **119** to the transmission channel.

A preferred embodiment of the present invention also includes means by which to access users via common access lines. These may include standard telephone, ISDN or B-ISDN, microwave, DBS, cable television systems, MAN, high speed modems, or communication couplers. Metropolitan Area Networks (MANS) which are common carrier or private communication channels are designed to link sites in a region. MANs are described by Morreale and Campbell in "Metropolitan-area networks" (IEEE Spectrum, May 1990 pp. 40–42). The communication lines are used to transmit the compressed data at rates up to, typically, 10 Mb/sec.

In order to serve a multitude of channel types, a preferred embodiment of the present invention includes a multitude of output ports of each type connected to one or more computers on the transmission and receiving system. The management of transmission is then distributed. That is, the computer controlling the transmission queue tells the transmission encoding computer its task and then the task is executed by the transmission encoding computer, independent of the transmission queue computer. The transmission queue computer provides the data for transmission by file server which also distributes to other transmitters located in the same or other transmission encoding computers.

FIG. **5** is a flowchart of a preferred method of implementing a queue manager program of the present invention. The queue manager program, in the distribution process, preferably confirms availability of an item from the compressed data library **118** and logically connects the item stored in compressed data library **118** to the communications controller, illustrated in FIG. **2***a* (step **5010**). After availability is confirmed in step **5010**, the data awaits transmission by the transmitter **122**.

After availability is confirmed in step **5010**, the communications controller preferably makes the physical connection to the reception system **200** of the user (step **5020**). This is normally done by dialing the receiving device of the user. The reception system **200** preferably answers the incoming call and confirms the connection (step **5030**).

Once connected to the reception system **200**, in steps **5020** **5030**, the data stored in compressed data library **118** is preferably transferred in data blocks from the compressed data library **118** to the communications controller (step **5040**). The data blocks are buffered by the communications controller. The buffered data is sent down the communications channel to the reception system **200** by transmitter **122** (step **5050**).

The transmitter **122** places the formatted data onto the communications channel. This is an electrical conversion section and the output depends upon the chosen communication path. The signal is sent to the reception system **200** in either a two way or a one way communication process. In a standard telephone connection, the transmitter **122** is preferably a modem. When using an ISDN channel, the transmitter **122** is preferably a data coupler.

In a preferred embodiment of the present invention, many forms of communication channels may be employed. Distribution of information is by common carrier communication channels whenever possible. These channels include common telephone service, ISDN and Broadband ISDN, DBS, cable television systems, microwave, and MAN.

In order that reception is performed efficiently, the reception system **200** confirms reception of the initial data block before receiving the remaining data blocks whenever possible (step **5060**). After all data blocks have been received and reception is confirmed, the communications controller breaks the physical connection to the reception system **200** (step **5070**). Then, confirmation of the transmission is sent to the queue manager (step **5080**). Finally, the queue manager updates the list and sends the information to the billing program, which updates the account of the user (step **5090**).

When item distribution occurs through a broadcasting method such as a communications satellite, the process is one way, with ongoing reception not being confirmed by the reception system **200**. In these situations, some further redundancy is included by transmission formatter **122** with the data blocks for error correction processing to be performed in the reception system **200**. In such one way communication situations, the queue manager program running in library system control computer **1123** confirm reception, via telephone line connection for example, to the reception system **200** after distribution. This should occur prior to updating the user's account and the dispatch lists.

The real time output signals are output to a playback system such as an audio amplifier and/or television. This output may also be sent to an audio/video recorder for more permanent storage. Moreover, in the preferred embodiment only non-copy protected data can be recorded on an audio/video recorder. Any material which is copy protected will be scrambled at the video output in a way which makes it viewable on a standard audio/video receiver but does not allow for recording of the material.

The reception system **200** has playback controls similar to the controls available on a standard audio/video recorder. These include: play, fast forward, rewind, stop, pause, and play slow. Since items are preferably stored on random access media, the fast forward and rewinding functions are simulations of the actual events which occur on a standard audio/video recorder. Frames do not tear as on an audio/video recorder, but in fast play modes they go by very quickly.

The library access interface **121** in the reception system **200** preferably includes a title window where a list of available titles are alphabetically listed. This window has two modes: local listing of material contained within the library system control computer **1123**, and library listing for all available titles which may be received from the available, remotely accessible libraries. The titles listed in this window are sent from the database on the library system control computer **1123** or the remote order processing and item database **300**.

The system may also preferably include dispatching control software which receives input from the remote order processing and item database **300** and sends distribution requests to the distribution systems. In instances where not all items are contained in each of the compressed data libraries **118**, the dispatching software will keep a list of the available titles in a particular compressed data library **118**. The dispatch software may also preferably coordinate network traffic, source material library **111** utilization, source material library **111** contents, and connection costs. By proper factoring of these variables, efficient use of the available distribution channels may be achieved.

FIG. **6** illustrates a block diagram of a preferred implementation of the reception system **200** according to the present invention. The reception system **200** is responsive to user requests for information stored in source material library **111**. The reception system **200** includes transceiver **201** which receives the audio and/or video information transmitted by transmitter **122** of the transmission system **100**. The transceiver **201** automatically receives the information from the transmitter **122** as compressed formatted data blocks.

The transceiver **201** is preferably connected to receiver format converter **202**. The receiver format converter **202** converts the compressed formatted data blocks into a format suitable for playback by the user in real time.

In the reception system **200** of the present invention, the user may want to play back the requested item from the source material library **111** at a time later than when initially requested. If that is the case, the compressed formatted data blocks from receiver format converter **202** are stored in storage **203**. Storage **203** allows for temporary storage of the requested item until playback is requested.

When playback is requested, the compressed formatted data blocks are sent to data formatter **204**. Data formatter **204** processes the compressed formatted data blocks and distinguishes audio information from video information.

The separated audio and video information are respectively decompressed by audio decompressor **209** and video decompressor **208**. The decompressed video data is then sent simultaneously to converter **206** including digital video output converter **211** and analog video output converter **213**. The decompressed audio data is sent simultaneously to digital audio output converter **212** and analog audio output converter **214**. The outputs from converters **211–214** are produced in real time.

The real time output signals are output to a playback system such as a TV or audio amplifier. They may also be sent to an audio/video recorder of the user. By using the reception system **200** of the present invention, the user may utilize the stop, pause, and multiple viewing functions of the receiving device. Moreover, in a preferred embodiment of the present invention, the output format converters may be connected to a recorder which enables the user to record the requested item for future multiple playbacks.

FIG. **7** is a flow chart **400** of a preferred method of distribution of the present invention. The distribution method is preferably responsive to requests identifying information to be sent from the transmission system **100** to remote locations. Method **400** assumes that the items have already been stored in compressed data library **118**.

As illustrated in FIG. **7**, the first step of the distribution method **400** involves retrieving the information for selected items in the source material library ill, upon a request by a user of the distribution system (step **412**). This is analogous to taking books off of a shelf at the local public library after the person has decided that he or she would like to read them.

After the information for the selected items is retrieved in step **412**, the distribution method **400** of the present invention further comprises the step of processing the information for efficient transfer (step **413**). The processing performed in step **413** preferably includes assigning a unique identification code to the retrieved information performed by identification encoder **112**, shown and described with respect to FIG. **2***a* (step **413***a*). The processing also preferably includes placing the retrieved information into a predetermined format as formatted data by converter **113** (step **413***b*), and placing the formatted data into a sequence of addressable data blocks by ordering means **114** (step **413***c*).

Processing step **413** also includes compressing the formatted and sequenced data performed by data compressor **116** (step **413***d*), and storing as a file the compressed sequenced data received from the data compression means with the unique identification assigned by the identification encoding means (step **413***e*).

After the information is processed for efficient transfer, in substeps **413***a–e* of step **413**, the distribution method **400** of the present invention preferably includes the step of storing the processed information is stored in a compressed data library (step **414**). Preferably, the compressed data library is analogous to compressed data library **118**, described with respect to FIG. **2***a*.

After the information is stored in a compressed data library **118**, the transmission and receiving system preferably waits to receive a transmission request (step **415**). Upon receiving a transmission request, from transmission system **100**, the compressed formatted data is preferably converted for output to a reception system **200**, selected by the user. The information is preferably transmitted over an existing communication channel to a reception system **200**, and is received by that system (step **417**). When the information is received in step **417**, it is preferably formatted the particular type of reception system **200** to which the information is sent.

The received information is preferably buffered (step **418**) by a storage means analogous to element **203** shown in FIG. **3**. The information is preferably buffered so that it may be stored by the user for possible future viewings. The requested information is then played back to the reception system **200** of the user at the time requested by the user (step **419**).

FIGS. **8***a–8e* are block diagrams of preferred implementations of data structures and data blocking for items in the audio and video distribution system. FIG. **8***a* shows the block structure of video data where a video frame **812** is composed of a plurality of video samples **811**, and a second of video **813** is composed of a plurality of video frames **812**.

FIG. **8***b* shows the block structure of audio data where an audio data frame **822** is composed of a plurality of audio samples **821**, and a second of audio **823** is composed of a plurality of audio data frames **822**. FIG. **8***c* shows the block structure of a data frame **832** composed of a plurality of data bytes **831**. The combination of the audio frames **812**, video frames **822**, and data frames **832** comprise the elements of a single item. FIG. **8***d* shows a block representation of for three illustrative items which may be stored in the source material library **111**. Each of items **1–3** contains its own arrangement of video frames **812**, audio frames **822**, and data frames **832**.

FIG. **8***e* shows methods of distribution to reception systems **200** with both multiplexed and non-multiplexed signal paths, both addressed and non-addressed blocks of items. A block of an item may be an entire item or, alternatively, may

be only a portion of an item, as selected by a user. Further, the blocks may composed of either compressed, partially compressed, or fully decompressed data, as required by the configuration of the reception system **200**.

As shown in FIG. **8***e*, the same block, for example, block **1**, may be simultaneously transmitted over different distribution channels. The blocks when transmitted over one of the distribution channels may have receiver addresses appended to the blocks or the reception system **200** may have been preconfigured to receive the blocks comprising data frames for particular items from the active distribution channel.

Other embodiments of the invention will be apparent to those skilled in the art from consideration of the specification and practice of the invention disclosed herein. It is intended that the specification and examples be considered as exemplary only, with the true scope and spirit of the invention being indicated by the following claims.

What is claimed is:

1. A transmission system responsive to input from a user positioned at an accessing location for transmitting information to a premises selected by the user, the transmission system comprising:

a plurality of libraries for storing items containing information;

identification encoding means for retrieving the information in the items from the plurality of libraries and for assigning a unique identification code to the retrieved information;

conversion means, coupled to the identification encoding means, for placing the retrieved information into a predetermined format as formatted data; and

transmitter means, coupled to the conversion means, for transmitting the formatted data to the premises selected by the user, wherein the premises selected by the user is not limited to a predetermined user premises.

2. A transmission system as recited in claim **1**, wherein the plurality of libraries are geographically separated.

3. A transmission system as recited in claim **1**, wherein the premises selected by the user is geographically separated from the accessing location.

4. A digital audio/video communication network comprising:

a reception system in data communication with a plurality of subscriber selectable receiving stations, the reception system comprising,

means for receiving compressed, digitized data representing at least one item of audio/video information at a non-real time rate,

means for storing a complete copy of the received compressed, digitized data, and

means, responsive to the stored compressed, digitized data, for transmitting a representation of the at least one item of audio/video information at a real-time rate to at least one of the plurality of subscriber selectable receiving stations, wherein said means for receiving, said means for storing, and said means for transmitting are positioned at the same location, and wherein the at least one of the plurality of subscriber selectable stations is located at a premises geographically separated from the location of the reception system.

5. A digital audio/video communication network as recited in claim **4**, wherein the means for transmitting comprises a converter for decompressing the compressed digitized data representing the at least one item of audio/video information.

6. A digital audio/video communication network as recited in claim **4**, further comprising a processing station for formatting items of audio/video information as compressed, digitized data and transmitting the compressed, digitized data representing at least one item of audio/video information at the non-real time rate to the means for receiving.

7. A digital audio/video communication network as recited in claim **6**, wherein the processing station comprises:

means for inputting items of audio/video information;

conversion means for placing each input item of audio/video information into a predetermined format as formatted data;

compression means for compressing the formatted data; and

transmitter means for sending compressed formatted data for the at least one item of audio/video information at the non-real time rate to the reception system.

8. A method of distributing audio/video information comprising:

transmitting compressed, digitized data representing a complete copy of at least one item of audio/video information at a non-real time rate from a central processing location to a local distribution system remote from the central processing location;

receiving, into a receiving means, the transmitted compressed, digitized data representing a complete copy of the at least one item;

storing, in a storing means, the received compressed, digitized data representing the complete copy of the at least one item at the local distribution system; and

in response to the stored compressed, digitized data, transmitting, using a transmitting means, a representation of the at least one item at a real-time rate to at least one of a plurality of subscriber selectable receiving stations coupled to the local distribution system, wherein the receiving means, the storing means, and the transmitting means are positioned at the same location, and wherein the at least one of the plurality of subscriber selectable stations is located at a premises geographically separated from the local distribution system.

9. A method as recited in claim **8**, further comprising the step of decompressing the compressed, digitized data representing the complete copy of the at least one item of audio/video information before the transmitting step.

10. A method as recited in claim **9**, wherein the decompressing step is performed in the local distribution system to produce the representation of the at least one item for transmission to the at least one of the plurality of subscriber selectable receiving stations.

11. A method of distributing audio/video information comprising:

formatting items of audio/video information as compressed digitized data at a central processing location;

transmitting compressed, digitized data representing a complete copy of at least one item of audio/video information from the central processing location;

receiving, into a receiving means, the transmitted compressed, digitized data representing a complete copy of the at least one item of audio/video information at a local distribution system;

storing, in a storing means, the received compressed, digitized data representing the complete copy of the at least one item at the local distribution system; and

using the stored compressed, digitized data to transmit using a transmitting means a representation of the at least one item to at least one of a plurality of subscriber selectable receiving stations coupled to the local distribution system, wherein the receiving means, the storing means, and the transmitting means are positioned at the same location, and wherein the at least one of the plurality of subscriber selectable stations is located at a premises geographically separated from the location of the local distribution system.

* * * * *

EXHIBIT

12

U.S. DISTRICT COURT – JUDICIAL CASELOAD PROFILE

TEXAS EASTERN			12-MONTH PERIOD ENDING SEPTEMBER 30							
			2006	2005	2004	2003	2002	2001	Numerical Standing	
									U.S.	Circuit
OVERALL CASELOAD STATISTICS	Filings*		3,658	3,583	3,860	4,072	3,610	3,452		
	Terminations		3,623	3,538	4,243	3,487	4,458	4,819		
	Pending		3,079	3,035	2,983	3,358	2,825	3,706		
	% Change in Total Filings	Over Last Year		2.1					14	2
		Over Earlier Years			-5.2	-10.2	1.3	6.0	41	5
Number of Judgeships			8	8	8	8	7	7		
Vacant Judgeship Months**			.0	.0	9.1	4.2	19.3	10.0		
ACTIONS PER JUDGESHIP	FILINGS	Total	457	448	483	509	515	493	38	6
		Civil	375	376	411	431	444	427	27	5
		Criminal Felony	82	72	71	77	70	66	36	3
		Supervised Release Hearings**	0	0	1	1	1	-	-	-
	Pending Cases		385	379	373	420	404	529	45	6
	Weighted Filings**		550	511	518	529	492	492	13	3
	Terminations		453	442	530	436	637	688	45	7
	Trials Completed		21	21	21	26	22	22	39	6
MEDIAN TIMES (months)	From Filing to Disposition	Criminal Felony	9.2	8.3	8.4	7.5	8.9	8.0	52	7
		Civil**	9.0	10.3	6.5	10.9	15.0	30.9	39	5
	From Filing to Trial** (Civil Only)		17.7	15.9	15.4	17.0	14.0	15.9	12	2
OTHER	Civil Cases Over 3 Years Old**	Number	80	64	47	41	58	881		
		Percentage	3.2	2.6	1.9	1.4	2.4	26.1	18	2
	Average Number of Felony Defendants Filed Per Case		1.6	1.7	1.7	1.7	1.4	1.7		
	Jurors	Avg. Present for Jury Selection	36.89	34.27	33.92	32.49	32.40	32.25		
		Percent Not Selected or Challenged	30.1	30.2	32.5	33.5	33.3	35.6		

2006 CIVIL AND CRIMINAL FELONY FILINGS BY NATURE OF SUIT AND OFFENSE

Type of	TOTAL	A	B	C	D	E	F	G	H	I	J	K	L
Civil	3001	156	318	1276	27	27	94	282	217	253	227	2	122
Criminal*	650	10	188	79	195	66	14	22	16	24	12	11	13

* Filings in the "Overall Caseload Statistics" section include criminal transfers, while filings "By Nature of Offense" do not.
** See "Explanation of Selected Terms."

EXHIBIT

13

U.S. DISTRICT COURT - JUDICIAL CASELOAD PROFILE

DELAWARE			12-MONTH PERIOD ENDING SEPTEMBER 30							
			2006	2005	2004	2003	2002	2001	Numerical Standing	
									U.S.	Circuit
OVERALL CASELOAD STATISTICS	Filings*		1,077	1,190	1,797	1,362	2,028	1,004		
	Terminations		1,419	1,448	1,516	1,507	1,478	1,020		
	Pending		1,501	1,853	2,085	1,836	1,999	1,477		
	% Change in Total Filings	Over Last Year		-9.5					74	6
		Over Earlier Years			-40.1	-20.9	-46.9	7.3	34	3
Number of Judgeships			4	4	4	4	4	4		
Vacant Judgeship Months**			.0	.0	.0	1.9	3.1	.0		
ACTIONS PER JUDGESHIP	FILINGS	Total	270	298	449	340	507	251	82	5
		Civil	233	264	414	306	462	233	73	5
		Criminal Felony	30	28	29	25	38	18	88	5
		Supervised Release Hearings**	7	6	6	9	7	-	87	4
	Pending Cases		375	463	521	459	500	369	48	5
	Weighted Filings**		367	422	534	424	516	379	71	4
	Terminations		355	362	379	377	370	255	69	4
	Trials Completed		15	20	19	23	18	16	65	3
MEDIAN TIMES (months)	From Filing to Disposition	Criminal Felony	9.3	9.4	9.1	8.3	9.8	8.0	56	2
		Civil**	16.8	10.9	14.0	11.2	8.2	12.6	91	5
	From Filing to Trial** (Civil Only)		26.0	23.5	26.0	24.0	22.5	21.0	49	3
OTHER	Civil Cases Over 3 Years Old**	Number	142	156	65	66	99	77		
		Percentage	10.6	9.1	3.4	3.9	5.4	5.5	76	5
	Average Number of Felony Defendants Filed Per Case		1.2	1.2	1.2	1.3	1.1	1.3		
	Jurors	Avg. Present for Jury Selection	39.60	39.82	38.50	34.98	33.84	32.68		
		Percent Not Selected or Challenged	24.1	22.8	20.9	24.0	24.4	19.9		

2006 CIVIL AND CRIMINAL FELONY FILINGS BY NATURE OF SUIT AND OFFENSE

Type of	TOTAL	A	B	C	D	E	F	G	H	I	J	K	L
Civil	930	32	6	233	12	6	20	76	52	160	132	51	150
Criminal*	117	-	26	14	29	20	-	2	5	10	2	-	9

* Filings in the "Overall Caseload Statistics" section include criminal transfers, while filings "By Nature of Offense" do not.
** See "Explanation of Selected Terms."

BEFORE THE JUDICIAL PANEL ON MULTIDISTRICT LITIGATION

In re:	)	
	)	
Rembrandt Technologies, LP Patent	)	MDL Docket No. 1848
Litigation	)	In re: Rembrandt Technologies, LP,
	)	Patent Litigation

PROOF OF SERVICE

I hereby certify that a copy of the below listed documents and this Certificate of Service was served by Federal Express Next Day Delivery on April 4, 2007, to the following parties.

- Reasons Why Oral Argument Should be Heard in Opposition to CoxCom's Motion for Transfer and Consolidation;
- Response to CoxCom's Motion for Transfer and Consolidation;
- Rembrandt's Brief in Opposition to CoxCom's Motion for Transfer and Consolidation; and
- The Exhibit list to Rembrandt's Brief in Opposition.

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